GAS

ENGINEERING • UTILIZATION • LOAD-BUILD • MANAGEMENT

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REYNOLDS GAS REGULATORS

From constant, dependable regulation of the smallest volume of gas to the largest—from lowest pressures to the highest—there are plenty of tough problems to lick in the industry.

REYNOLDS Gas Regulators insure instant control—poised control, flexible and accurate . . . The 45 years of experience Reynolds engineers have had at these very problems have well-equipped them as victors when any factor of regulation is concerned.

Call upon Reynolds to assure successful co-operation. Whether it's a Branch Office, Representative, or the Factory, Reynolds Engineers are at your service!

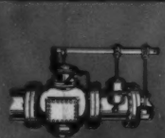
BRANCH OFFICES: 421 Dwight Building, Kansas City, Missouri; 2nd Unit, Santa Fe Building, Dallas, Texas

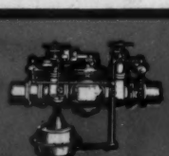
REPRESENTATIVE: Eastern Appliance Co., Boston, Massachusetts

REYNOLDS GAS REGULATOR CO.

Anderson, Indiana, U. S. A.

RECOGNIZED GAS CONTROL SINCE 1892


HIGH PRESSURE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INDUSTRIAL

SERVICE

LOW PRESSURE

OCTOBER 1937 • • 25 CENTS

PRINT IN BINDING

EMCO *Built*

ALWAYS MEANS *Better Built*

METERS AND REGULATORS

"Up to a standard, rather than down to a price" has always been this company's creed. We believe there are certain essential factors which must be adhered to in maintaining the quality of our products. Sound engineering is one of them. That's why we employ a staff of engineers trained in problems of the Gas Industry. We buy only the best obtainable raw materials, and test all purchases to be sure they meet our rigid specifications. For this purpose our own physical and chemical laboratories are maintained.

The men who build EMCO products are skilled craftsmen, some of them with service records in our employ of fifty years. They pride themselves in the quality of their work, and to help them gain that quality, we have installed in our factories the finest automatic precision equipment.

With such a combination, it is easy to see why EMCO Built always means Better Built Meters and Regulators.

PITTSBURGH EQUITABLE METER CO.

MERCO NORDSTROM VALVE CO.

MAIN OFFICES PITTSBURGH, PA.

NEW YORK LOS ANGELES TULSA HOUSTON MEMPHIS BUFFALO
COLUMBIA KANSAS CITY CHICAGO PHILADELPHIA ATLANTA OAKLAND

COMPOSITE VIEW OF THE MOST MODERN AND BEST EQUIPPED METER, REGULATOR, AND VALVE FACTORIES IN THE WORLD.

Thor Announces-

A sensational *new* GAS HEATED

clothes dryer

to retail for only

$39.95

A new load builder

(Consumption Approximately 1/3 Therm Per Hour)

- Has Capacity Equivalent to 96 Feet of Clothes Line.
- Compact—Light—Sturdy.
- Has Efficiency of $200 Built-in Dryer.
- Easy to Install.

Write Today FOR OUR PROSPECTUS GIVING COMPLETE INFORMATION AND DETAIL PROMOTIONAL PLAN.

For Complete Information, Write Today!

HURLEY MACHINE CO.

GAS APPLIANCE DEPT

CERMAK ROAD AND 54TH AVENUE · CHICAGO, ILLINOIS

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GAS

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Formerly Western Gas

LOS ANGELES	CHICAGO	HOUSTON
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Phone Michigan 1481	Phone HARrison 8536	Phone Capitol 2093

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With COOPER-BESSEMERS on The Line!

Expansion of one of the greatest pipe-line systems of modern times — that of the Panhandle Eastern Pipe Line Company — has included 13 additional Cooper-Bessemer compressor units and 2 auxiliary units installed this year stepping the total installed Cooper-Bessemer horsepower on this line up to 50,360.

Seven main compressor stations with their attending auxiliary stations along the Panhandle line are Cooper-Bessemer equipped. Liberal and Louisburg, Kans., Glenarm, Ill., Sneed, Tex., Houstonia, Mo., Greensburg and Haven, Kans.

THE COOPER-BESSEMER CORPORATION

640 EAST 61st STREET . . . LOS ANGELES, CALIFORNIA

25 West 43rd St., New York City Mills Bldg., Washington, D. C. 631 Spring St., Shreveport, La. 201 East 1st St., Tulsa, Okla. Magnolia Bldg., Dallas, Texas Esperson Bldg., Houston, Texas

Mount Vernon, Ohio — PLANTS — Grove City, Pennsylvania

16,000 H.P. INSTALLED DURING LAST EIGHT MONTHS

The CLARK new design "250" with its modern full-pressure lubricating system, overhead exhaust, and sturdy construction, has always been a favorite in plants where heavy loads and long hours are part of the regular routine.

CLARK'S policy of keeping this horizontal unit strictly up-to-the-

CLA

minute as regards every possible mechanical improvement has enabled the "250" to maintain its strong position in its field, in spite of the stiff competition from the new, sensational CLARK "Super 2 Angle."

CLARK has pioneered nearly every major advance in the heavy compressor field. Bulletins on request.

NEW INSTALLATIONS
Since Jan. 1, 1937

Standard Oil Co., of Louisiana
Phillips Petroleum Company
Cabot Company
Parade Gasoline Company
Humble Oil & Refining Company
Smith Bros. Refining Company
Hercules Gasoline Corporation
Gregg-Tex Gasoline Company
Empire Oil & Refining Company
Ohio Counties Natural Gas Co.

ARK

See CLARK Section, 1937 Composite Catalog.

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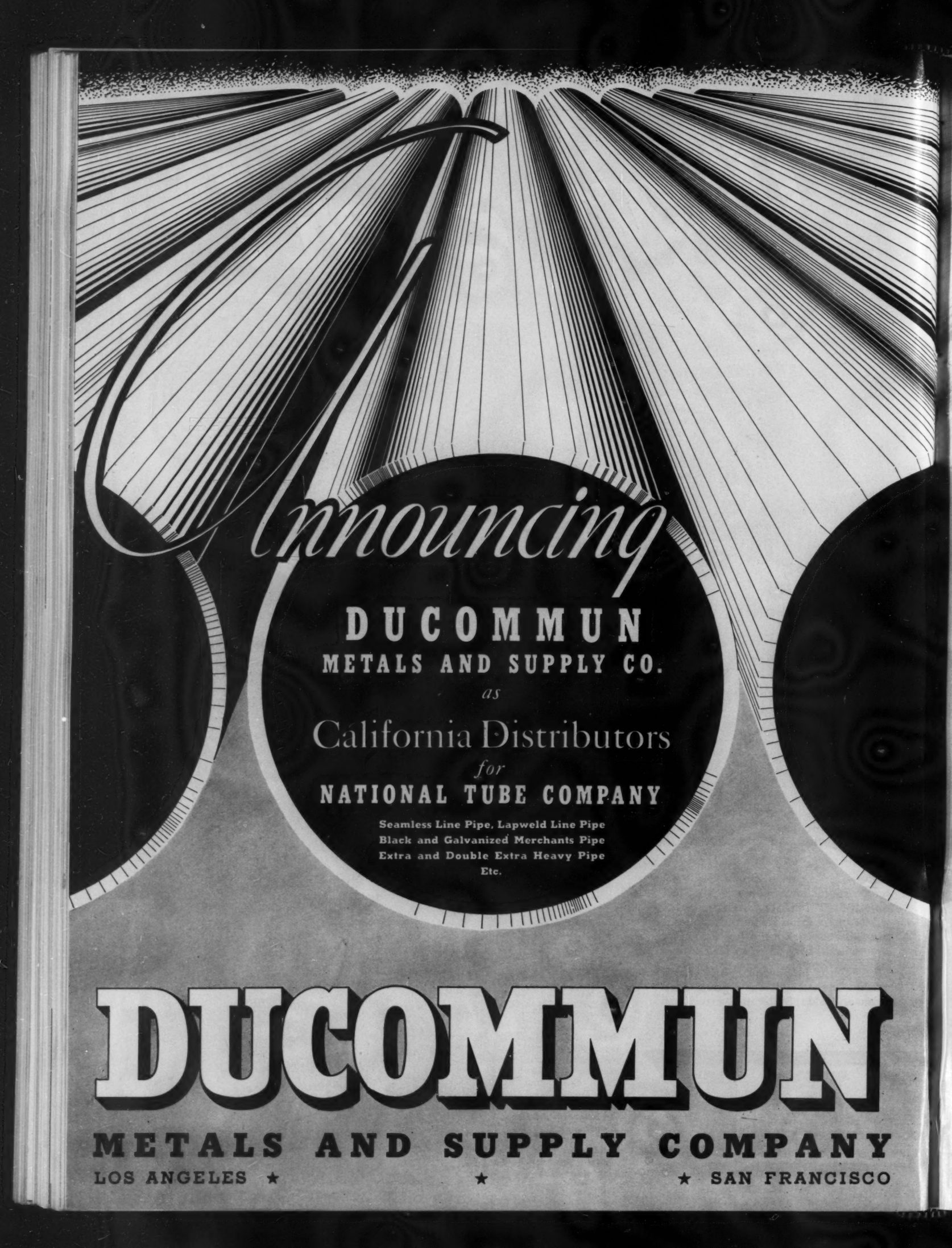
Olean, New York, U. S. A.

Export Office: 30 Rockefeller Plaza, New York. Midcontinent Sales Offices and Warehouses: Tulsa, Okla., and Houston, Texas. West Coast Office: Smith-Booth-Usher, 2001 Santa Fe Ave., Los Angeles. Foreign Offices: 72 Turnmill St., E. C. 1, London, England; 4 Str. General Poetas, Bucharest, Roumania.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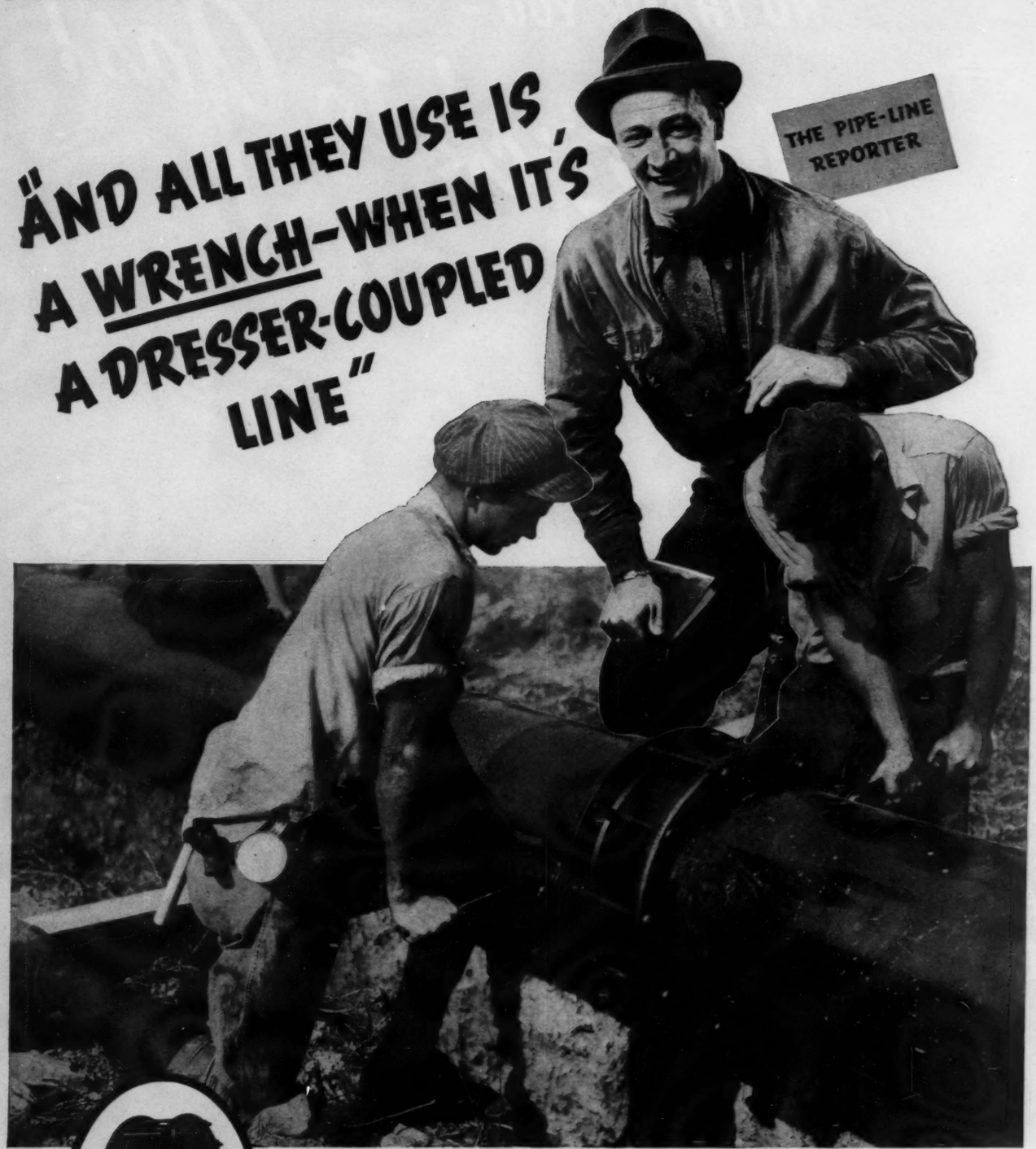
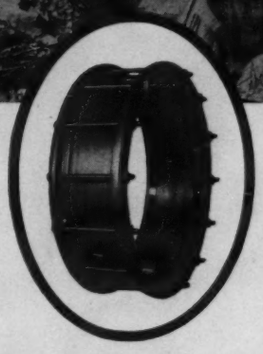
DUCOMMUN
METALS AND SUPPLY CO.
as
California Distributors
for
NATIONAL TUBE COMPANY
Seamless Line Pipe, Lapweld Line Pipe
Black and Galvanized Merchants Pipe
Extra and Double Extra Heavy Pipe
Etc.
DUCOMMUN
METALS AND SUPPLY COMPANY
LOS ANGELES ★ ★ ★ SAN FRANCISCO

"AND ALL THEY USE IS A WRENCH—WHEN IT'S A DRESSER-COUPLED LINE"





Complicated and expensive jointing equipment is neither seen nor heard—along a Dresser-coupled line! The cost of such apparatus—and the expense of its operation, maintenance, and transportation—is saved. All that's needed is one tool—a simple wrench—to tighten the bolts . . . enabling unskilled labor to make *permanently tight* joints in minimum time.

NOTE TO READER

This is the eighth in a series of advertisements dramatizing one engineer's experience with his first Dresser-coupled line. For the complete story, write for Bulletin 351.

S.R. **DRESSER**
MANUFACTURING CO., BRADFORD, PA.
In Canada: Dresser Mfg. Company, Ltd., 60 Front Street, West, Toronto, Ont.

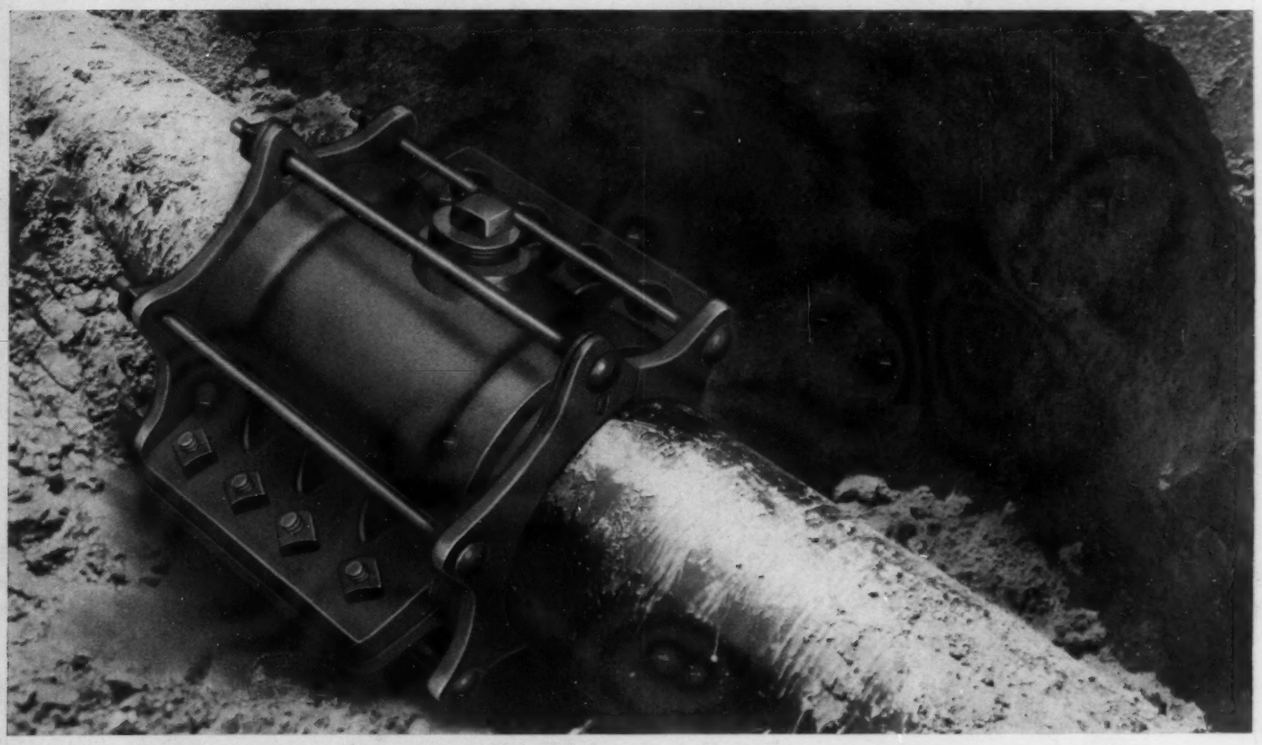
CLEAN GAS MAKES SATISFIED CUSTOMERS

Expansion of your gas business depends upon how well your gas serves in the modern appliances, controls and meters with their delicate, easily-clogged mechanisms. You know that right around the corner competition is waiting for one sign of dissatisfaction from your customers. You know also that "home-made" gas cleaners will not meet modern requirements. They are often the source of complaints and high service costs. Make gas more popular . . . insure a *continuous* delivery of CLEAN gas and a minimum of service trouble with Blaw-Knox Gas Cleaners. They are preferred by leading operating engineers everywhere.

BLAW-KNOX
COMPANY

2033 Farmers Bank Building, Pittsburgh, Pa.

Prepare Now for WINTER BREAKS



DAYTON NO. 8-A SPLIT SLEEVES

THE NATIONAL SUPPLY CO. OF DELAWARE
DAYTON COUPLING DIVISION · · TOLEDO · OHIO

★

We are Proud
of Our Modest Share
in the Operating Success of the

PANHANDLE EASTERN PROJECT

Our Work in this Program
has consisted of . . . .

IN 1936

The Engineering, Design and Construction of the Original Gasoline and Dehydration Plants at Liberal.

These Plants include Gasoline Extraction and Dehydration Units for perfectly conditioning the Gas for long Distance Transmission.

AND NOW

IN 1937

The Extension of the Liberal Gasoline and Dehydration Plants and the Additions to the Liberal, Haven and Greensberg Compressor Stations to handle the Increased Load this year.

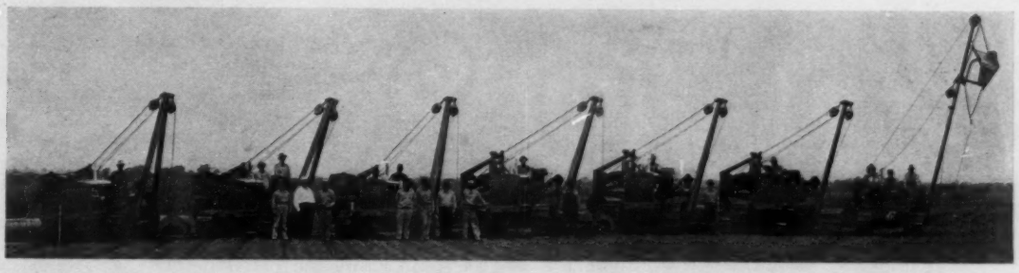
THE STEARNS-ROGER MANUFACTURING CO.
DENVER

★

PARKHILL-WADE, INC.
LOS ANGELES

Ready ---- GO!

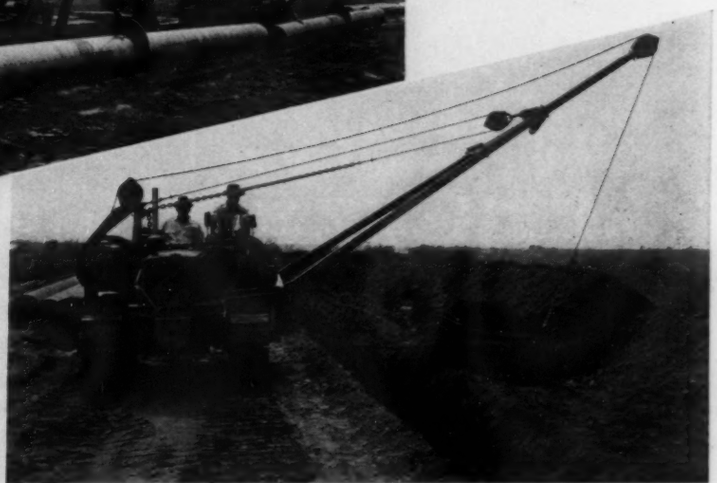
Three PG Sidebooms with "Caterpillar" RD6 Diesel tractors, three PJ Sidebooms with "Caterpillar" RD7 Diesel tractors and Model V Backfiller with "Caterpillar" RD4 Diesel tractor.



These are CARDWELL ALLSTEEL "Caterpillar" mounted pipe line booms and backfiller all ready to go from scratch on the Panhandle Eastern 24" pipe line . . . the race is for PROFITS—and HOW . . . Profits to the Panhandle Eastern Pipe Line Company in getting their job finished on time and Profits to Bibb Contracting Company by keeping the job going without loss of time.

PG Sideboom with "Caterpillar" RD6 Diesel tractor and PJ Sideboom with "Caterpillar" RD7 Diesel tractor.

LINE UP CREW
READY TO START JOB



Model V Backfiller with "Caterpillar" RD4 Diesel tractor

SPEED

Ahead of Schedule Completion—That is what counts with the Contractor when there is a job to be done—and DONE WELL.

Note wide range of visibility and easy accessibility of controls.

CARDWELL ALL STEEL
REG. U. S. TRADE MARK PAT. OFFICE
THIS TRADE MARK INSURES HIGHEST QUALITY AT LOWEST PRICE

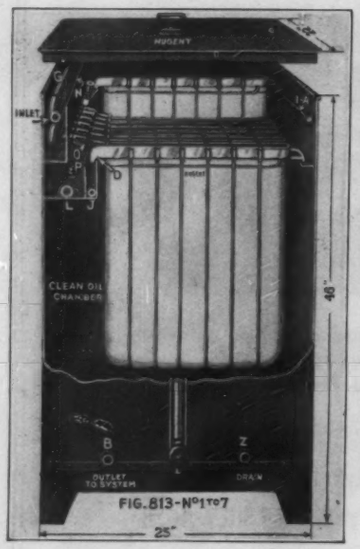
ALLSTEEL PRODUCTS MFG. CO.
Wichita, Kansas, U. S. A.
801 So. Wichita St., P. O. Drawer 2001
CABLE ADDRESS "ALLSTEEL" PHONES L. D. 289, LOCAL 4-4381—4-4382

SEE PAGES
83-84-85-86
1937 ISSUE

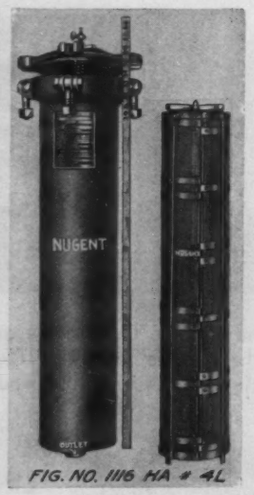
NUGENT

OIL FILTERS AND SIGHT-FEED VALVES

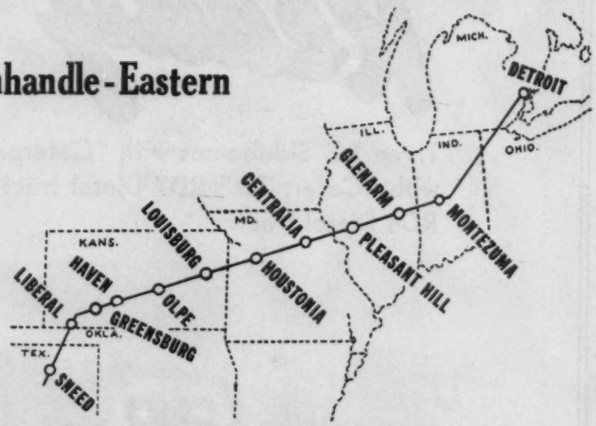
On all of the 62 Compressor Units of the Panhandle-Eastern Natural Gas Pipe Line



30 GRAVITY FILTERS INSTALLED
For the Cooper-Bessemer Compressors



44 PRESSURE FILTERS INSTALLED
For the Worthington Compressors

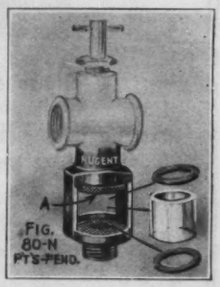


MAP OF THE LINE SHOWING COMPRESSOR STATIONS

All the oil used on the bearings of these 62 mighty Cooper-Bessemer and Worthington engines is filtered through NUGENT OIL FILTERS and used over and over again. NUGENT SIGHT FEED VALVES having removable sight glasses for easy cleaning without stopping the oil flow, feed the proper amount of oil to each bearing.

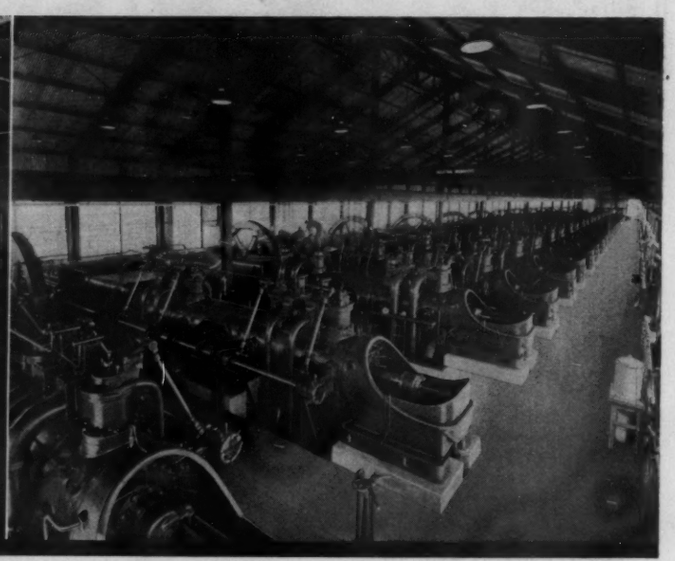
NUGENT OILING and FILTERING SYSTEMS were used on the Chicago Line . . . and now are being installed on the Panhandle Line serving Detroit, Mich. This is a tribute to NUGENT DESIGN . . . NUGENT PERFORMANCE . . . and NUGENT EXPERIENCE based on MORE THAN 30 YEARS OF SERVICE.

Write for Illustrated Bulletins.



1050 Nugent Sight Feed Valves installed on both makes of Compressors.

Interior of existing station at Liberal, Kansas, showing Cooper-Bessemer installation. Two additional Cooper-Bessemer units were added this year, raising the station total to 7,000 H.P.



Battery of Worthington units in this interior view of Fritch station on the Natural Gas Pipeline Co. of America line, is typical in arrangement to the Worthington installations being made on Panhandle Eastern project.

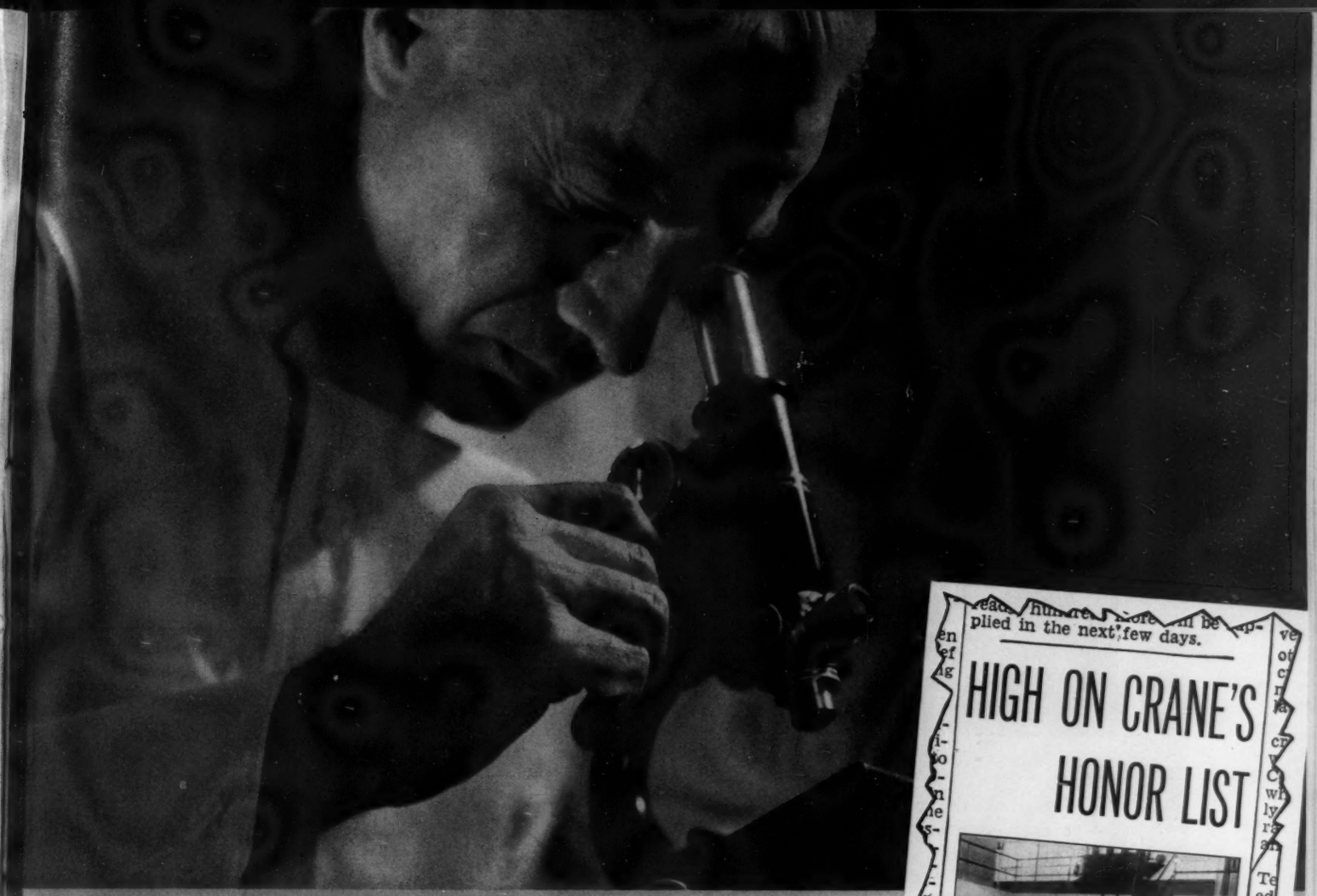
NUGENT TRADE MARK

Wm. W. Nugent & Co., Inc. Mfrs.

Oil Filters, Oiling and Filtering Systems, Telescopic Oilers, Oiling Devices, Sight Feed Valves, Flow Indicators, Compression Union Fittings, Oil Pumps, Etc.

421 N. Hermitage Ave. Established 1897 Chicago, U. S. A.

NUGENT TRADE MARK



"Looking into Tomorrow"

Crane research engineers are always testing ahead of industry's actual needs. It is the only way they can be sure of having valve materials and designs ready for the pressures, temperatures and corrosive elements expected tomorrow.

If you have a tough valve, fitting or piping problem, come to Crane. With the most extensive research laboratories in the business—the largest plant—the biggest line—Crane can supply what you want, if anybody can!

Most "new" valve problems can easily be solved by reference to your No. 52 and other Crane Catalogs. In them are the answers to a host of questions that Crane has answered successfully for thousands of users. In them are the details regarding over 38,000 items, tested in the laboratory and proved on the job. Use them whenever you need valves, fittings, pipe or accessories.

CranEquip for satisfaction.

CRANE

CRANE CO., GENERAL OFFICES: 836 S. MICHIGAN AVENUE, CHICAGO ILL.

Branches and Sales Offices in One Hundred and Sixty Cities

VALVES, FITTINGS, FABRICATED PIPE, PUMPS, HEATING AND PLUMBING MATERIAL

plied in the next few days.

HIGH ON CRANE'S HONOR LIST

CHICAGO, ILL., Sept. 22—High on the list of jobs in which Crane has been particularly honored by extensive use of its products, is the name of the Panhandle Eastern Pipe Line.

Since the inception of this line in 1930, Crane valves and fittings have manfully mastered many of the tasks of controlling the flow of gas through this great system.

The CranEquipment which Panhandle installed is similar in quality and efficiency to the CranEquipment which has been successfully serving pipe lines at home and abroad since the modern miracle of gas transportation began to develop. This record of past performance, which led to the selection of Crane valves and fittings by Panhandle, is assurance of satisfactory service for years to come.

Whatever your piping problems, CranEquip. It is the ready road to piping satisfaction.

Why the trend toward SEAMLESS LINE PIPE?

because **NATIONAL SEAMLESS**

1. Offers greater all-round reliability
2. Has high tensile strength
3. Is exceptionally uniform
4. Has unusual ductility
5. Is adaptable to any type of joint
6. Has no welds — no long line of possible weakness

THESE are the reasons why pipe line operators and engineers are growing more and more partial to *seamless* pipe—and specifying NATIONAL Seamless Line Pipe—for gas, oil, and gasoline lines.

Technical experts agree that the seamless process produces line pipe superior to that made by any other method. A section of NATIONAL Seamless Pipe is a balanced, homogeneous unit, pierced and rolled from a solid billet of steel, with no longitudinal line of potential weakness. Since only the finest open-hearth steels are used, its integrity is of the highest — you get pipe of uniform wall strength throughout.

In many of America's most important lines, you'll find NATIONAL Seamless Line Pipe consistently giving satisfactory service under a wide variety of conditions. In every consideration, it has proved thoroughly reliable.

Whenever you have a problem concerning line pipe, consult our research and field service staffs. Their recommendations are based on the best standards of up-to-date line pipe practice.

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

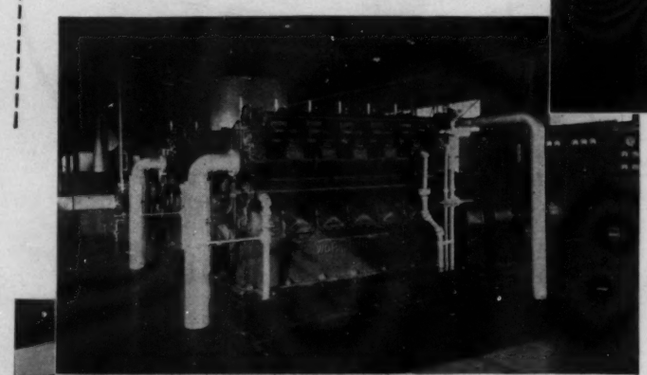
UNITED STATES STEEL

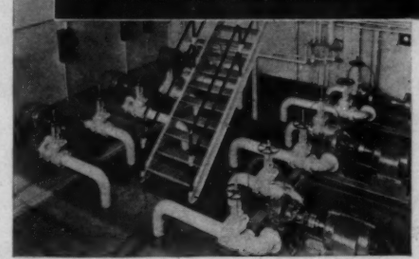
On the

PANHANDLE EASTERN PIPE LINE SYSTEM

from Texas to Detroit . . .

Right—Three of six Worthington 1300-hp. Gas Engine Gas Compressors . . . at Olpe, Kansas, Station





Worthington 180 hp. Vertical Gas Engine, for auxiliary service . . . at Pleasant Hill, Illinois, Station

Battery of Worthington Centrifugal Pumps, in jacket water and cooling tower service . . . at Pleasant Hill, Illinois, Station

27

WORTHINGTON COMPRESSORS TOTALLING 35,100 HORSEPOWER

are doing an outstanding job

IN addition to the main compressor units, there are 12 Worthington Vertical Gas Engines, 2160 total horsepower, in station service. These, with 72 jacket water and cooling tower centrifugal pumps, add further testimony to the enviable reputation of their builder.

GC7-3

WORTHINGTON PUMP AND MACHINERY CORPORATION

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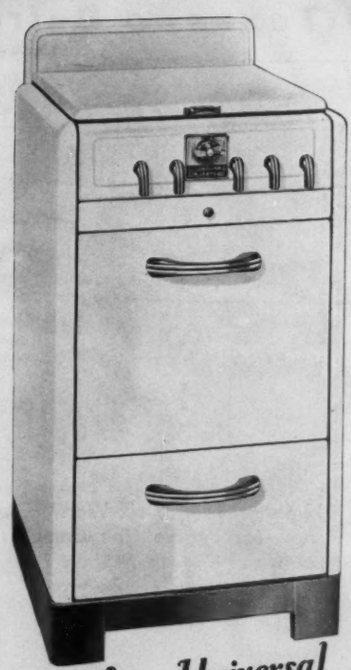
THAT MEETS THE BASIC NEEDS OF THE GAS INDUSTRY

Chatham Universal



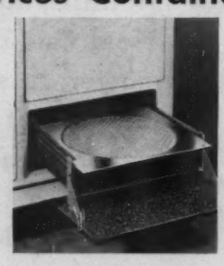
Gotham Universal

THE GAS SERVICE IS ONLY AS MODERN AS THE GAS RANGE!

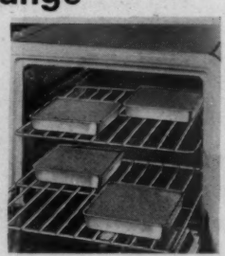
● The Universal Gas Range promotes the highest standards of cooking performance in every division of cookery. It gives increased convenience of use, economy of food and fuel, and virtually complete release of the Homemaker's time throughout every phase of the actual cooking operation. This high standard of service is not confined to only a relatively few models, but embraces every type of unit from the kitchenette to the six burner, double oven Universal Range. The Universal Gas Range definitely advances the cause of Gas because it meets the basic needs of the Gas Industry and creates a new appreciation on the part of the consumer as to the true merits of gas as the ideal cooking fuel.

The Standard of Cooking Performance Depends Entirely on the Devices Contained in the Range

The Simmer-Save Burner is a specially engineered device. It is actually two burners in one, containing (1) two burner throats; (2) two separate valves.



The Universal In-A-Drawer with Savory Broiler Grid makes possible a new advancement in the art and method of broiling. It eliminates smoke.



Universal Precision Oven incorporates scientifically engineered devices that make possible certain, simplified results. (1) Low Temperature Oven Burner; (2) Temperature Stabilizers.

UNIVERSAL GAS RANGES

MANUFACTURED BY CRIBBEN & SEXTON CO., 700 NORTH SACRAMENTO BOULEVARD, CHICAGO, ILL.

GAS
October, 1937

Guest Editorial

AN OPEN MIND

By C. E. GALLAGHER

President, The East Ohio Gas Company
Cleveland, Ohio

IT seems to me that the first requisite in the gas business is the same that is true of all business—an open mind and a complete consciousness that the world about us is not only changing but always has been changing, and always will be. The application of this principle can go no further in a generalized formula than a promise to ourselves that all angles of our business, as fast as they turn up and as rapidly changing as they are, shall be given the strictest consideration.

The background of our business is political, using the word "political" in its true sense. This cannot be changed, and it need not cause us any grave concern if we just remember that any political background is no more and no less than the public's attitude, in this case the public's attitude toward us.

In the many changes that are taking place at present in our social and economic life, we note on the part of the public that there is a critical and sometimes cynical attitude toward public utilities and their service, and considering the difficulties of the times this is not surprising. We certainly cannot expect to be immune from social judgment, and it is our responsibility to be more kindly and understanding and diplomatic in our service. This service of ours can only be successful providing a strongly entrenched public opinion is enlisted to obstinately and fearlessly withstand every effort of the demagogue.

One reason the public is very critical is a feeling that utilities such as ours are prosperous while they, the public in general, have had to face a good many hard economic situations. Though we know we have suffered through business depression, increases in taxes, and lowering of rates, we must meet criticism patiently and understandingly.

This can only be accomplished if management and employee are linked together to translate the company and its policies to the consumer in terms of service and personal attention. Education of everyone connected with our organizations in the knowledge of his company and the reasons for all it does, is all important. No one avenue can accomplish this spirit of co-operation in an organization, but I believe conference meetings of groups in which both management and employees are represented and where customer policies are open-mindedly discussed, is a necessary approach to its accomplishment. The employees can educate the management quite as much as the other way around.

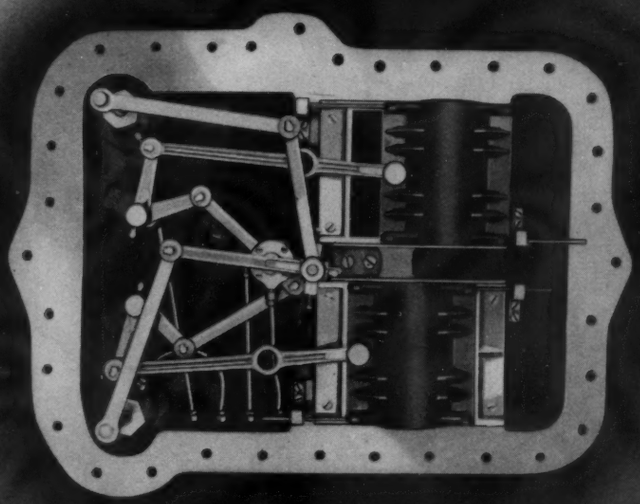
Our consumers are entitled to have a full, accurate, and dependable disclosure of all facts connected with our business through all avenues of publicity, so they will be able to judge the soundness of our rates and service, for it is impossible to reach sound conclusions until all facts are known and understood.

What are you getting

Study the valve connections illustrated. Angular movement of the working parts is reduced and wear lessened. Special materials are utilized . . . Alemite-lubricated bearings and dust caps (for the larger-sized meters) . . .

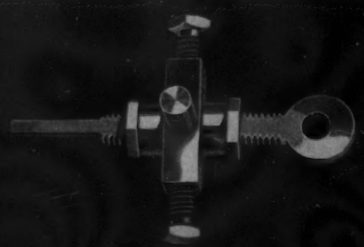
You'll discover this same, painstaking devotion of METRIC engineering to the smallest detail of Ironcase design and construction. Ironcase meter capacities range from 165 to 10,000 cu. ft. per hr. at ½" loss, for low-pressure meters; nearly double this capacity at 2" water loss; and up to 90,000 cu. ft., for high pressures. Also the space dimensions occupied by individual meters in relation to capacities, are exceedingly favorable.

Manufactured on the slide valve and the full bellows diaphragm principle, each meter is built to achieve the MAXIMUM in reliable performance and accuracy.



. . . WHEN YOU BUY A METRIC IRONCASE METER?

TYPE 35-B



Adjustable Tangent

Diaphragm, Flag Rod and Flag Rod Bearing

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October, 1937

GAS

Vol. XIII, No. 10

THIRTEENTH YEAR OF PUBLICATION

LOS ANGELES
810 South Spring Street

CHICAGO
1064 Peoples Gas Bldg.

HOUSTON
306 Shell Bldg.

GAS Presents This Month

THIS month G A S features two stories on the Panhandle Eastern Pipe Line Company's mammoth loop-line construction program, which is now nearing completion. Data for the articles was compiled by Craig Espy, assistant publisher, and he writes us that he had the time of his life chasing down first hand information on the subject. His experiences, so he says, ranged from pleasurable and informative conversations with such Panhandle Eastern executives as B. R. Bay, J. C. Reinbold, Fay Walters, S. A. Taylor and J. S. Stevenson to an early morning, life-shortening, mile-a-minute automobile trip with W. N. "Stump" Pressly, driver for W. S. Bibb, of the firm of E. H. Reeder, in charge of construction on the eastern division.

The ride came about as a prelude to a picture-taking expedition. Mr. Espy arose one morning in Columbia, Mo., at 5 o'clock, and accompanied Messrs. Bibb and Pressly to the Houstonia loop, where the day was spent in taking the photographs which illustrate the articles. Pictures of the Missouri River crossing were taken during the height of activity through arrangements made by Mr. Stevenson with J. W. Hall, resident engineer for the company on the river crossing job.

All in all, Mr. Espy enjoyed himself thoroughly and has asked us to thank publicly the men mentioned above, who helped him gather the material for the articles.

Every one knows that this is the month of the biggest annual event in the gas industry's march of progress. Pardon us then, if we again (on page 26) call attention to the American Gas Association's 19th annual convention, which is even now meeting in Cleveland. In connection with the convention, we have published two articles—one (Page 28) on gas scrubbing by Professor C. C. Furnas of Yale University, and other (Page 39), a digest of "The Precision Method of Testing Gas Leaks," by E. F. Schuldt, which is certain to receive much attention, when it is reviewed before the Distribution Committee.

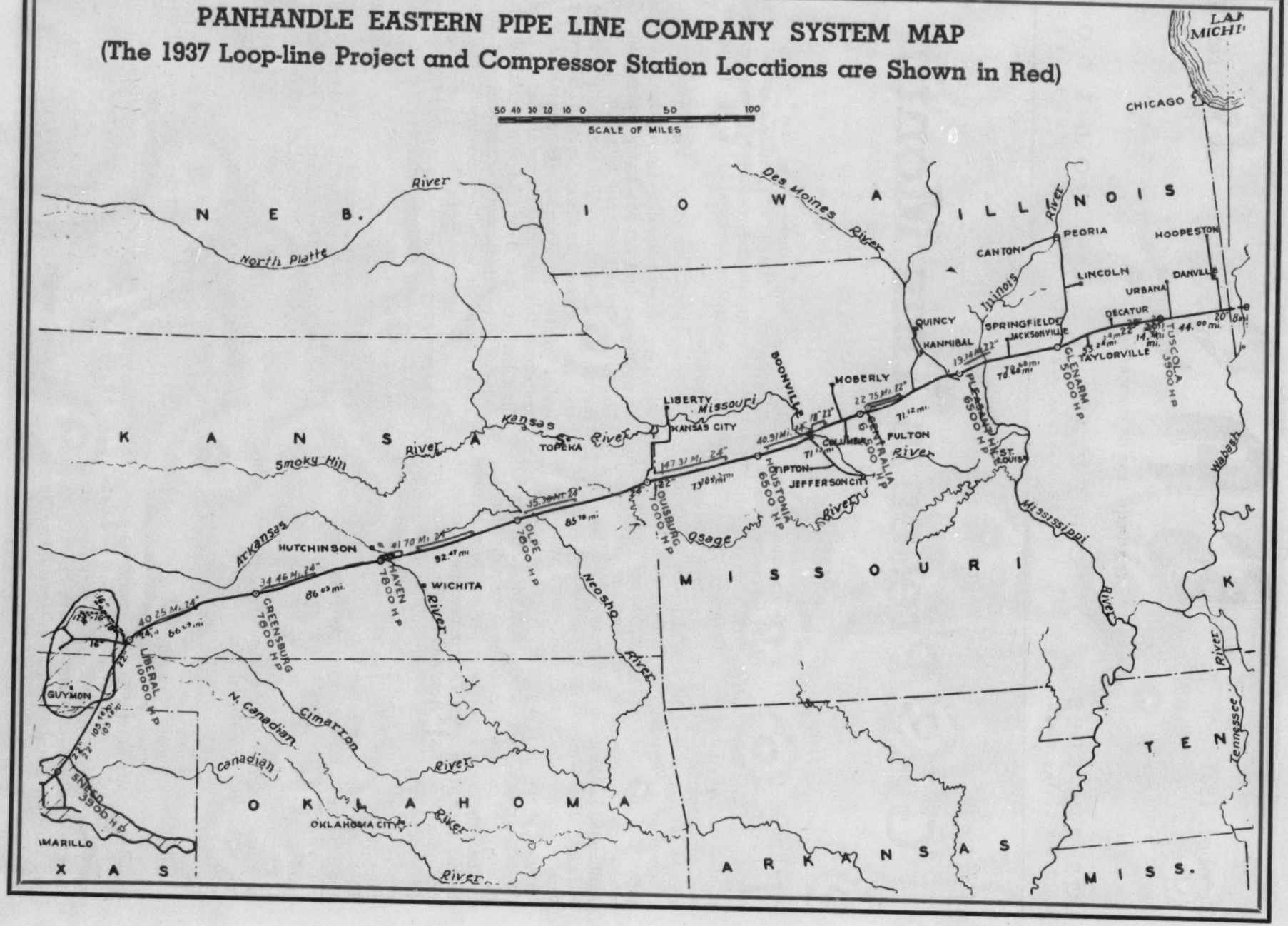
Getting into the digest section of the book (Pages 39 to 56) we find various topics under discussion. Blackwell Newhall outlines some pointers in promoting public relations. The three-article series on the gas company appliance testing laboratory is ended by George Wehrle, who comments on the procedure followed in testing appliances in mile-high Denver. Ray Trowbridge of Seattle discusses some of the experiences encountered and conclusions arrived at in selling commercial heat in his city.

More on the technical side we find W. R. Schneider dealing with methods of controlling electrolysis on underground pipe lines. Such control involves careful investigation and intelligent use of a combination of insulating joints and electrical bonds. R. I. Snyder on the subject of gas lighting with a small indoor unit, offers fundamental data on mantle life, light output and radiating efficiency, under variables of pressure, primary air and B.t.u. Gas engine maintenance and operation is the topic of Leal Davis.

Of course, we cannot on one page give you the complete menu for this month, but we do believe that by turning through the folios you will be able to discover several morsels of useful and interesting information. And while you are reading the present number of G A S, keep in mind that in November we will not only bring you a full report of the American Gas Association's Cleveland meeting but will also publish several of the Convention's outstanding papers.

PANHANDLE EASTERN PIPE LINE COMPANY SYSTEM MAP

(The 1937 Loop-line Project and Compressor Station Locations are Shown in Red)

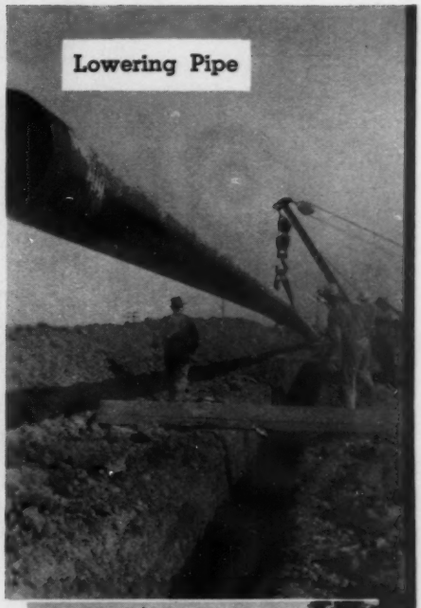


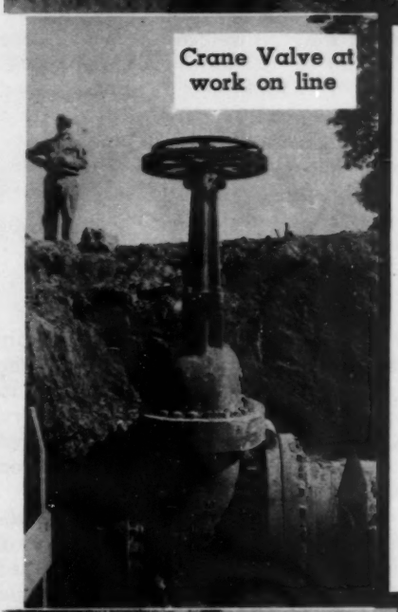
PANHANDLE EASTERN EXPANDS

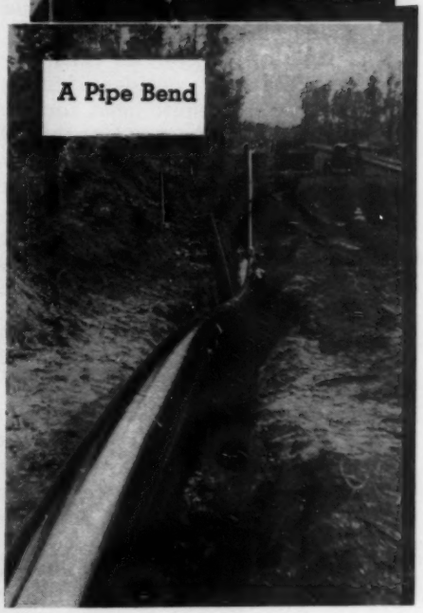
PIPE LINE PROJECT AND COMPRESSOR STATIONS

281-Mile Loop-line to Serve Expanding Markets; Compressor Facilities Increased by 29,400 hp.

By CRAIG ESPY Assistant Publisher, GAS


Lowering Pipe


Crane Valve at work on line


A Pipe Bend

ACTUAL and anticipated gas load at points in Indiana and in Detroit is the motivating influence behind the 281-mile loop line project now nearing completion by Panhandle Eastern Pipe Line Co. The project represents one of the largest loop-line developments undertaken in the gas industry.

Very early this year Panhandle Eastern developed final plans for the project after having spent much time in estimating its future load requirements and calculating what added physical equipment would be necessary to meet its estimated peak day demands.

The pipe-line map published on the page opposite will suggest the extent of the Panhandle Eastern system which was launched as a cross country carrier back in 1930 and which reached its climax with the signing of a contract in 1935 for the sale of gas to Detroit City Gas Co.

The new loop lines are shown in red and will be seen to proceed from eight of the company's compressor stations. For the most part the loop lines strictly parallel the main line.

The length of each loop is also recorded on the map; the lengths as well as the diameter of pipe having been carefully calculated by the company's engineers on the basis of what was necessary to meet estimated peak load demands.

For the most part the distance between the main line and the loop lines is approximately 50 ft. Where blasting was necessary because of rock encountered the distance between the two lines was widened to 75 ft. to avoid damage that might occur from the exploding charge. In a few other places the separation was widened to a greater distance because of undesirable terrain or other obstacles.

In January of this year the engineering department of Panhandle Eastern started to design and draft compressor stations. Loops were surveyed and mapped shortly thereafter so as to provide right-of-way information for the land department.

Plans and specifications were completed by the last of March and invitations to bid on constructing the line were mailed to interested contractors.

When the bids were submitted on April 16th Tom R. Jones, Inc., of Dallas, Texas, was awarded the contract for constructing the first four loops from the west—Liberal, Greensburg, Haven, and Olpe; and E. H. Reeder of Dallas, with W. S. Bibb in charge, was given the contract for the four eastern loops including Louisburg, Houstonia, Centralia, and Pleasant Hill.

The stringing contract on the western section was sub-let to C. Hobson Dunn of Dallas and the similar job on the eastern section to Parkhill Truckign Company of Tulsa, Okla.

H. C. Price, Inc., of Bartlesville, Okla., secured the welding contract for both sections. Composite construction being specified, two 40-ft. lengths of pipe were electrically welded and the resulting 80-ft. sections joined together with Dresser couplings. This type of construction was used throughout except for river crossing lines

Allsteel Products' Model V Backfiller with "Caterpillar" RD4 Diesel tractor in operation with the line-up crew on the Panhandle Houstonia loop-line.

Sending home a Dresser Coupling bolt on the Houstonia Loop.

W. S. BIBB, in charge of construction on the eastern division, and F. L. TOWNSEND, chief inspector, eastern division for Panhandle Eastern Pipe Line Company.

which were all welded. National Tube Co. and A. O. Smith Corp. pipe was selected. Pipe specifications called for an average length of 40 ft., with a wall thickness of 9/32 in. and an ultimate tensile strength of 70,000 lbs. Pipe having a wall thickness of 5/16 in. was used on the discharge side of compressor stations.

Contractors Delayed

The contractors were considerably delayed in starting construction of the loops. Dust storms held the work up for two or three weeks in western Kansas and excessive rains delayed the start for a like period of time on the eastern section.

Stringing on the Liberal Loop began May 13th and actual pipe laying three days later. Stringing started on the Louisburg Loop May 11th and pipe laying on May 17th.

The right-of-way for all construction purposes was considered to be 50 ft. wide. The requirement for the trench was that it be not less than 6 in. wider than the outside diameter of the pipe with a depth sufficient to provide a covering of at least 30 in. measured from the top of the pipe to the original level of the ground, except where overbends occurred the minimum allowable cover was 36 in.

At river crossings and across low lands, subject to flood waters, the required trench provided a covering of at least 36 in.

For protection against corrosion Barrett Co. and Wailes Dove-Hermiston Corp. pipe-line enamels were used. In applying this protection the pipe was thoroughly cleaned on the outside by means of a gasoline engine driven cleaning machine. A paint primer was then applied with a similar machine and the hot coat of enamel followed. A coupling compound was poured over the Dresser coupled joints. After enameling, electrical holiday detectors were passed over the line. All pin holes, holidays and thin spots were then daubed behind the detector and the detector was again passed over the pipe as a final inspection to insure complete coverage.

Lengths of pipe to be joined by welding were tacked at four points, 90 degrees apart before the main weld was started. Welding was done on adjustable dollies wherever they could be used.

Flow of gas in the loop lines and in the main line is controlled by Crane Valves located at 8-mile intervals. The valves on the loop lines are located adjacent to the valves on the main line. The valves operate at a maximum working pressure of 500 lbs. gage. All main line valves are anchored in concrete foundations.

Interconnections between the main line and the loop lines were constructed at gate valve locations.

Concrete Thrust Blocks

Four reinforced concrete thrust blocks located at the beginning and ending of each loop anchor the pipe. The thrust blocks are 12 by 7 ft. each containing approximately 6 cu. yds. of concrete. The blocks are poured against undisturbed earth.

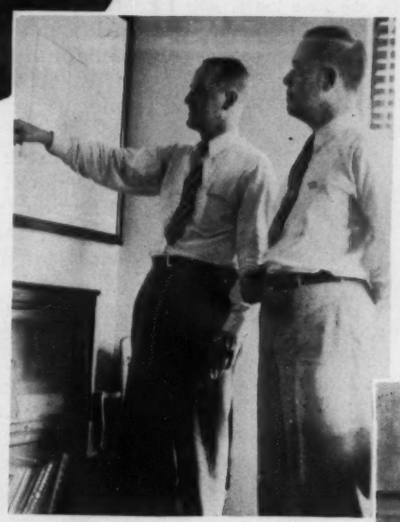
A deadweight leakage test is made following the completion of each loop. The line is first purged and cleaned by blowing gas through it from the main line for a brief period of time. After reconnection the line is packed to 300

lbs. pressure and later to 450 lbs. pressure, at which pressure it is allowed to stand for 48 hours. Inspection and leak tests are made while the line stands at both 300 and 450 lbs. pressure. During the tests the loop line and interconnections are blanked off by blind discs. The deadweight test is observed continuously over a period of approximately 24 hours.

River Crossing Problem

The problems of construction seem mainly to be those associated with the river crossings and with the rough country traversed by portions of the line. A separate article deals with the river crossings, particularly with the one regarded as presenting the most obstacles, the Missouri River. (The article on the Missouri River crossing appears on Page 24.)

D. K. STEVENS, Construction Superintendent, is snapped on the job.



G. T. KOCH, Compressor Superintendent, and J. S. STEVENSON, chief engineer Panhandle Eastern, looking over system map.

One construction item of particular interest is found in the erection of regulation highway snow fences on the leeward side of a section of the line to break the force of the wind and keep it from blowing the backfill from the top of the trench.

I. C. Little of Dallas has completed the construction of a gathering system which includes 51 miles of 18-, 16- and 12¾-in. line extending into Grant, Haskell, Stevens, and Seward Counties in Kansas.

J. C. Reinbold, general superintendent of the transmission department, has charge of the pipe line construction, reporting to Burt R. Bay, vice-president and general manager of Panhandle Eastern and to J. D. Creveling, president of the company.

On the operating end, G. T. Koch is compressor superintendent; F. C. Walters, measurement superintendent; E. J. Sunderland, chief dispatcher; M. M. Farley, chief clerk; J. L. Murphy, J. L. Wright, C. O. McCoy and W. K. Sanders, division superintendents.

In the Construction Division, D. K. Stevens is construction superintendent; J. J. Tipton, assistant construction superintendent; R. T. Nichols, chief clerk; L. Laster, chief inspector, Western section; F. L. Townsend, chief inspector, Eastern section; J. W. Hall, resident engineer, Missouri River crossing; E. Stanley, chief inspector Grant County gathering system; and P. H. Miller in charge dead weight tests.

J. S. Stevenson is chief engineer of the company, H. W. Pope has charge of right-of-way, and S. A. Taylor is the company purchasing agent.

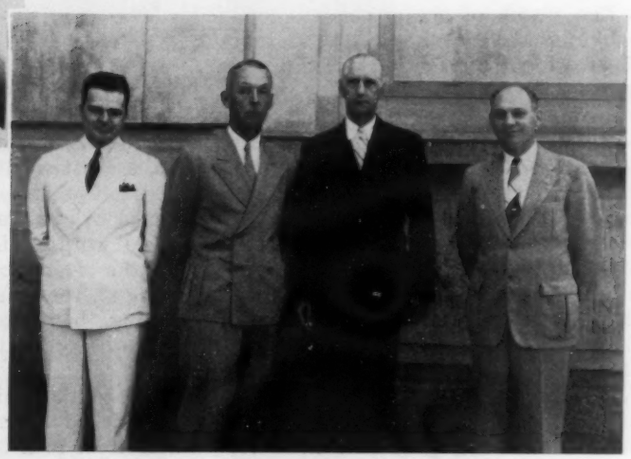
Much Equipment Used

As an indication of the vast amount of pipe line equipment necessary to a construction job of this magnitude a list of equipment operating on one of the loops is given below:

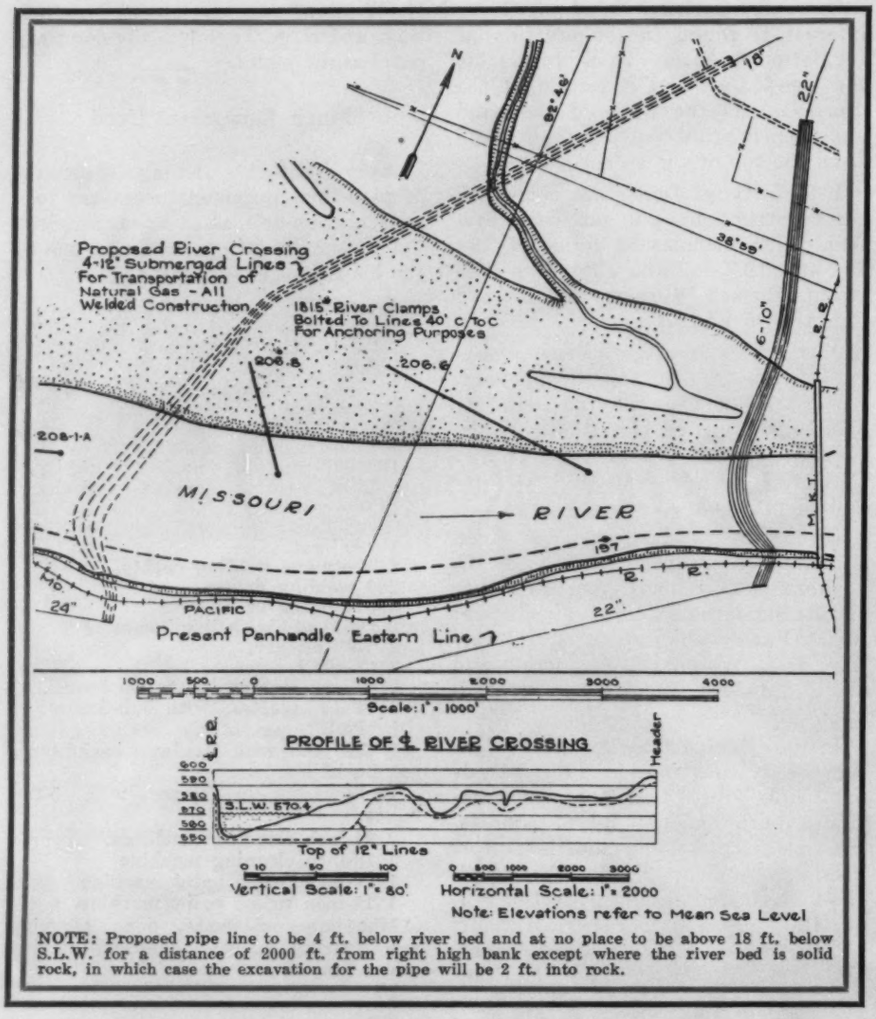
2 trucks with side booms.
4 trucks with semi-trailer.
2 trucks with flat bottom.
1 truck with flat bottom.
16—1½ ton trucks with trailers.
2 boom trucks.
1 "30" cat.
8 "400" welding machines
1 "400" welding machine on skids.
1 "300" welding machine on skids.
10 1½ ton trucks.
'1 "20" cat.
1 "30" cat.
2 Acetylene welding outfits.
200 welding dollies.
500 welding skids.
3 "60" cats with live booms.
2 "48" ditchers.
2 "T-20" tractors.
2 "T-40" tractors with live booms.
2 "T-40" tractors with bull-dozers.
1 "P&H" excavator.
1 "30" Cat with Cardwell backfiller.
1 backfiller.
10 Lowering-in horses with 5-ton hoists.
2 24-inch cleaning machines.
1 18-inch cleaning machine
1 24-inch prime paint machine
1 18-inch prime paint machine.
Miscellaneous swabs, dope carrying and pouring buckets, coupling coating pans, digging tools, etc.
20 sets Barrett rolling rigs.
3 24-inch Holiday detectors.
1 18-inch Holiday detector.
7 500 gal. dope pots.
4 250 gal. dope pots.
2 bending outfits.
1 air compressor.
1 24-inch road auger.
1 24-inch road auger jabber.
1 complete blacksmith shop.

It should also be mentioned that the September 1936 Detroit Souvenir Edi-

(Continued on Page 74)



Caught in a group are four Panhandle Eastern executives. (Left to right) S. A. TAYLOR, purchasing agent; J. D. FREEMAN, superintendent of production; J. F. CURRY, sales executive; H. W. POPE, superintendent, land department.


Proposed River Crossing
4-12" Submerged Lines
For Transportation of
Natural Gas - All
Welded Construction
18 15" River Clamps
Bolted To Lines 40' c/to c
For Anchoring Purposes
MISSOURI
RIVER
PACIFIC
Present Panhandle Eastern Line
Scale: 1" = 1000'
PROFILE OF ℄ RIVER CROSSING
Header
S.L.W. 570.4
Top of 12" Lines
Vertical Scale: 1" = 80'
Horizontal Scale: 1" = 2000
Note: Elevations refer to Mean Sea Level
NOTE: Proposed pipe line to be 4 ft. below river bed and at no place to be above 18 ft. below S.L.W. for a distance of 2000 ft. from right high bank except where the river bed is solid rock, in which case the excavation for the pipe will be 2 ft. into rock.

Plan of Panhandle Eastern Pipe Line Company's submarine pipe system across the Missouri River near Booneville, Mo.

CROSSING

GAS STAFF REPORT

OF several river crossings made in the current Panhandle Eastern pipe-line project, the crossing of the Missouri River at Booneville, Missouri, is of the most interest.

The sketch of the crossing accompanying the article shows the four lines which required approximately 33,360 ft. of 12¾-in. O. D. seamless steel pipe, taking off from the river header on the right bank, bowing up stream in a north and northeasterly direction across the river into a lowland area, thence to the east header where a crossover line ties-in the original crossing with the current project. An 18-in. line leading from the east river header converges with the original 22-in. line a few miles farther on, to end the Houstonia Loop, the two headers on the east side of the river being designed for an additional 18-in. line in the future.

Government specifications stipulated that the four 12¾-in. O. D. river lines making up the current river crossing be laid 18 ft. below standard low water level for a distance of 2,000 ft. from the right bank except where the river bed is solid rock. In this case the excavation for the pipe shall be 2 ft. in the rock.

Williams Bros., of Tulsa, Okla., are constructing the crossing. They came on the location June 24th to unload pipe, but their activities were restricted to constructing river headers and to working in the lowland area until the river receded. High waters, having prevented an early start on the crossing, have contributed considerably to delay in the construction program.

Toward the end of July the water had reached from a 10-ft. mean low water level to a 3-ft. low water level allowing the work to be started in the channel.

The minimum depth of the trench provided for in the lowland area is a covering of 36 in. from top of the pipe.

Drilling and Dredging

Getting the pipe into the required depth of rock presents the main problem of construction. As this is written the job of blasting the rock is still underway.

At the south bank of the river and extending approximately 300 ft. into the river is a rock ledge of sandstone. Although the rock ledge does not extend into the actual channel of navigation, it was necessary, in order to meet War Department requirements, to lay the pipe lines 2 ft. below the top of the rock. As the four lines spread out fan-wise in an upstream direction from the bank, it was necessary at the south bank to drill and blast out about 600 cu. yds. of rock. The rock blasting and drilling was sublet by the William Bros. to the Al Johnson Construction Co. of Minneapolis.

By means of a 120-ft. drill barge, fittingly named the *Hornet*, holes are drilled in the limestone ledge. The barge is equipped to drill 20 holes at a time but due to the angular position with the crossing which it has to assume in the river because of the 4-mile-per-hour current, only five holes are drilled at a time.

Holes are drilled 5 ft. in depth so that the minimum depth of 2 ft. will be maintained to the farthest reach of the charge. Approximately 4 lbs. of dynamite are placed in each hole. The boat withdraws about 100 ft. to set off the explosion.

A dredge operates ahead of the drilling barge, removing the several

PANHANDLE EASTERN EXPANDS

THE MISSOURI RIVER

Blasting Problems, High Water Make Four-line Booneville Project a Difficult Engineering Feat

feet of gravel and sand collected in places above the rock and depositing this overburden outside the river channel, above the high water line. The drill barge was, just before this issue went to press, cutting a 50-ft. channel about 18 ft. below water level through a sand bar near the north bank of the river. This sand bar stands 15 ft. above the present water level, and the distance across it, above water, is approximately 250 ft. It was expected that the rock drilling and blasting would be completed during the second week of September, and that the actual laying of the pipe in the river proper would begin during the following week.

All river lines are of solid welded construction. In the case of the Missouri River three joints are first welded on the banks. The welded sections are placed upon a barge, towed to the site of the crossing and fed out and lowered into the stream as they are welded to the pipe previously laid. Cast iron river clamps, each weighing 1800 lbs., are placed at every 40-ft. weld except in the deep part of the channel, where they are attached at 20-ft. intervals. Every section is thoroughly tested before the pipe is finally laid.

Actual footage of pipe in the river will be about 7400 ft. The land lines, consisting of some 2600 ft. of pipe, have already been completed. All pipe, however, between headers is

AT TOP
Crane valves at the west header of the crossing.

ABOVE
The four crossing lines disappear into the Missouri.

ABOVE
Dynamiting the Missouri River bottom. Drill barge in background.

AT LEFT
At work on the east header fabrication.

regular river pipe, weighing 49.5 lbs. to the foot.

In the sandy stretches of the river, where dynamite is unnecessary, a suction pump withdraws the sand from beneath the string of pipe, allowing it to settle, of its own weight, to proper depth.

The header set-up on the Missouri River is essentially the same as that on other principal streams. It consists of a joint of pipe the same size as the main line, closed at each end

(Continued on Page 46)

ON THE A. G. A. CONVENTION

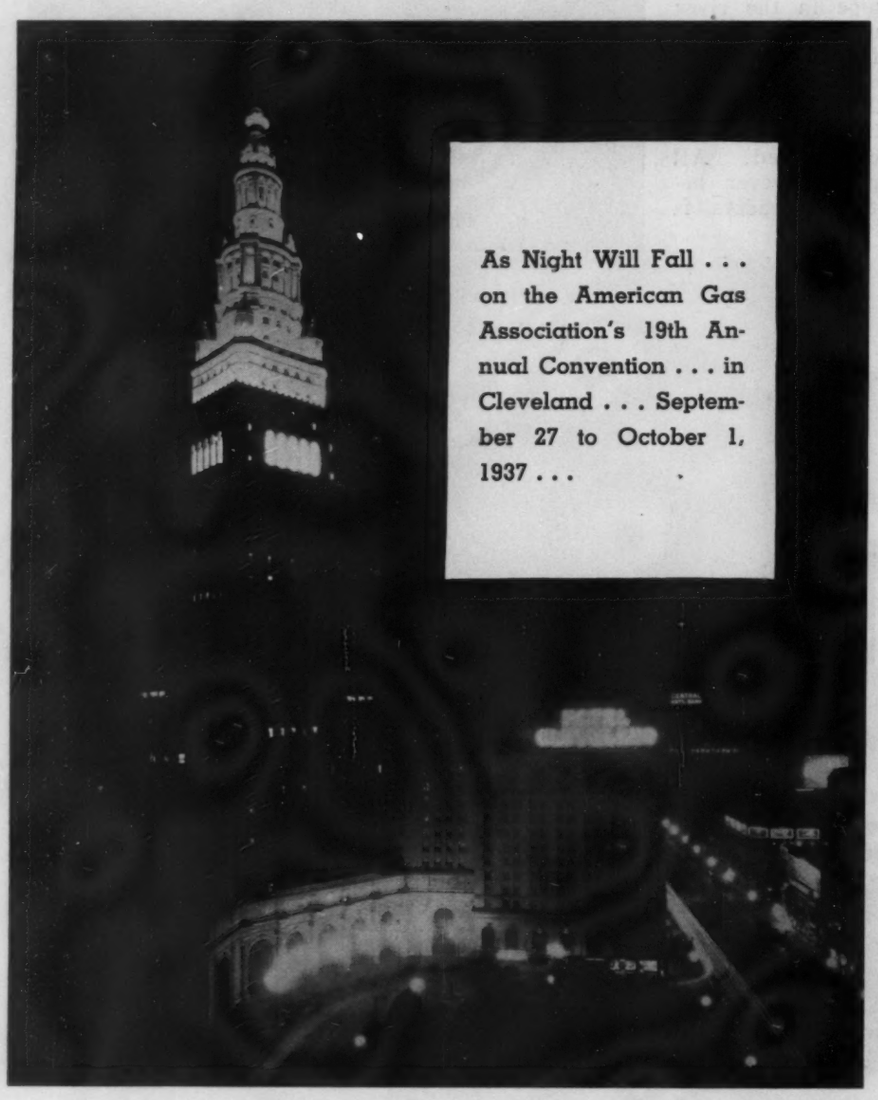
AS THESE pages go to press, gas men from the far reaches of the United States have already started for Cleveland, Ohio, to attend the nineteenth annual convention of the American Gas Association which opens on September 27 and will continue through October 1. Reservations pouring in to Cleveland hotels indicate that total attendance will probably equal the pacemakers in convention history. Present will be men representing every phase of the industry.

What awaits them is a four-day program packed to the brim with informative sessions, an opportunity to inspect the world-famous A.G.A. Testing Laboratories, and entertainment in variety tuned to vacation mood.

Convention sessions will be held at both the Statler and the Cleveland Hotels. General sessions and meetings of the Commercial and Industrial Sections will be held at the Statler, while the Natural Gas Department, the Accounting, and the Technical Sections will meet at the Cleveland Hotel. Executive functions, including the President's Dinner, will be held at the Cleveland.

Three general sessions are on the program. They are booked for Tuesday, September 28, at 10 a. m.; Wednesday evening at 8, and Thursday morning at 9:30.

The evening session is new at the convention. At this time Herman Russell, president of the American Gas Association and president of Rochester Gas and Electric Corp., will deliver the presidential address. Medals will also be awarded Wednesday evening to individuals in the gas industry who have performed distinguished service during the year. The medals are the A.G.A. Meritorious Service Medal, the Charles A. Munroe Award, and the Beal Medal. The male chorus of Rochester Gas and Electric Corp. will sing, and dancing will follow the close of the general session.



At the general session on Tuesday morning, N. C. McGowen, president, United Gas Public Service Corp., Houston, Texas, and nominee for A.G.A. president for 1937-38, will speak on "Conservation—An Industry Opportunity and Responsibility." Another address awaited with interest is that on "What the Gas Industry Must Do Next," by Walter C. Beckjord, vice-president and general manager, Columbia Gas & Electric Corp., New York. Frank H. Adams, president of Surface Combustion Corp., will make a timely address on "Serving American Industry."

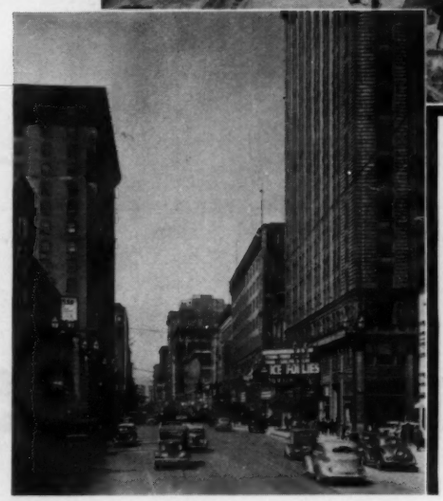
The final general session, Thursday morning, will cover a wide range of subjects of vital interest to the industry, such as national advertising, housing, personnel management, and customer relations. Charles C. Parlin, director of commercial research for the Curtis Publishing Company, will deliver an address entitled, "Telling the Story Nationally." He is an authority on co-operative national advertising.

"Customer Relations" will be dealt with in an address by Conrad N. Lauer, president of The Philadelphia Gas Works Co. T. H. A. Tiedemann, former executive assistant to the president of the Standard Oil Co. of New Jersey, will take up the problem of "Industrial Relations and Personnel Management." Opportunities for the industry in the home-building movement which has been gaining momentum rapidly will be covered by Dwight James Baum, architectural consultant for *Good Housekeeping*.

From 11:45 to 12, during this session, the Mystery Chef will make one of his regular broadcasts, speaking directly from the stage of the ballroom, where the National Broadcast-

PROGRAM...

Speakers Renowned
The Mystery Chef
Laboratory Tours
Session at Night
Entertainment



This air view of Cleveland shows the down-town section, with the stadium in the foreground. At left is a view along Euclid Avenue at Seventeenth Street. Cleveland, advantageously located on Lake Erie, is one of the nation's great industrial centers. It leads the world in production of heavy machinery.

ing Company will place its equipment for the event. This broadcast will go to Eastern N.B.C. stations which serve participating companies. The program for Western stations will be broadcast later in the day.

Wednesday morning has been named Executives Day at the Testing Laboratories and a special program will be presented there at two sessions—one at 10 o'clock and one at 11. Attendance at this meeting is by invitation. R. W. Gallagher, vice-president of Standard Oil Co. of New Jersey, and B. J. Mullaney, vice-president, The Peoples Gas Light and Coke Co., Chicago, will speak. Both are past presidents of A.G.A.

Special sessions will lead off the convention program. The Natural Gas Department will convene at 10:30 a. m. and at 2 p. m. Monday. The A.G.A.E.M. will meet at 9:30 a. m. The Accounting, Commercial, Industrial Gas, and Technical Sections will meet daily on Tuesday, Wednesday, and Thursday afternoons. The Accounting Section's Wednesday meeting will consist of a series of luncheon conferences devoted to customer accounting, general accounting, credits and collections, and customer relations. The Industrial Gas Club luncheon will be held on Tuesday.

On Wednesday morning at 8:30 those interested in Home service will meet at breakfast in the Hotel Statler.

A luncheon conference will also be held by the Committee on Personnel Practices on Tuesday at 12:30 at the Hotel Statler, and on Thursday, there will be a luncheon symposium by the Publicity and Advertising Committee.

The Natural Gas Department program includes addresses by George E. Welker, chairman of the department, President Russell of A.G.A., and Alexander Forward, managing director of the Association. F. M. Banks, vice-president of Southern California Gas Co. and chairman of the Commercial Section, will speak on "Meeting Competition." A paper on "Necessary Standby Fuel and Equipment for Industrial Natural Gas Customers" will also be included in the morning session. During the afternoon session, William T. Rasch, president of A.G.A.E.M., will describe what the industry plans to do at the New York World Fair, and there will be addresses on "Legislation and Taxation" by William A. Dougherty, Gas Companies, Inc., New York, and "2000 Years of Progressive Evolution of the Worker," by A. A. Nichoson, The Texas Corp., New York.

The Testing Laboratories will be open during the entire week of the convention and guides will be on hand to show visitors through and explain details of the work. This is the first time that the A.G.A. convention has been held in Cleveland and affords the first opportunity for the membership as a whole to inspect the institution which has grown up as a result of the industry's own efforts to regulate and improve its products and service and to protect its customers.

Outstanding on the entertainment program will be the President's Dance on Tuesday evening, the dance following the general session on Wednesday evening, and the women's luncheon and card party Wednesday afternoon.

Golf clubs will be open to American Gas Association delegates from Monday to Friday by payment of regular club charges for green fees.

Most of the industry's representatives will arrive in Cleveland in time to visit the Great Lakes Exposition on Sunday, September 26, which has been designated as American Gas Association Day. The exposition has delayed closing beyond its scheduled time in order to give convention delegates opportunity to view the displays.

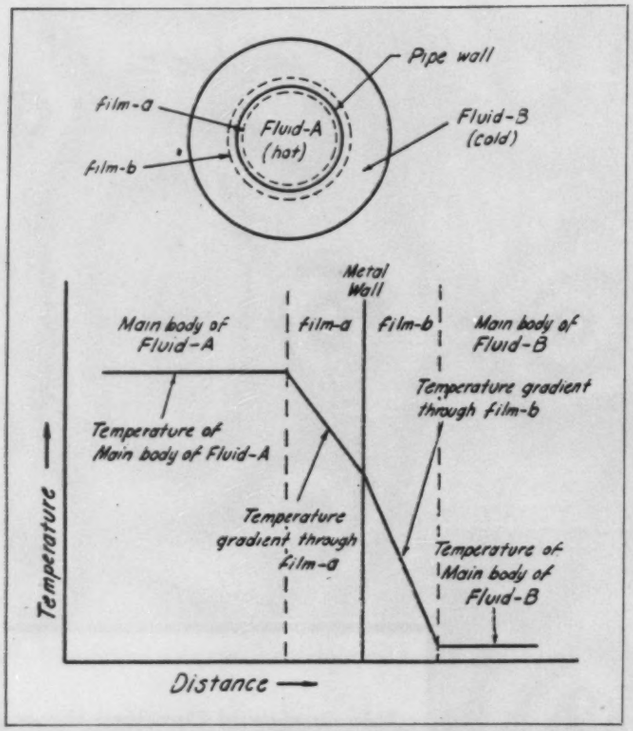


FIG. 1. Film conditions in a double-pipe heat transfer apparatus.

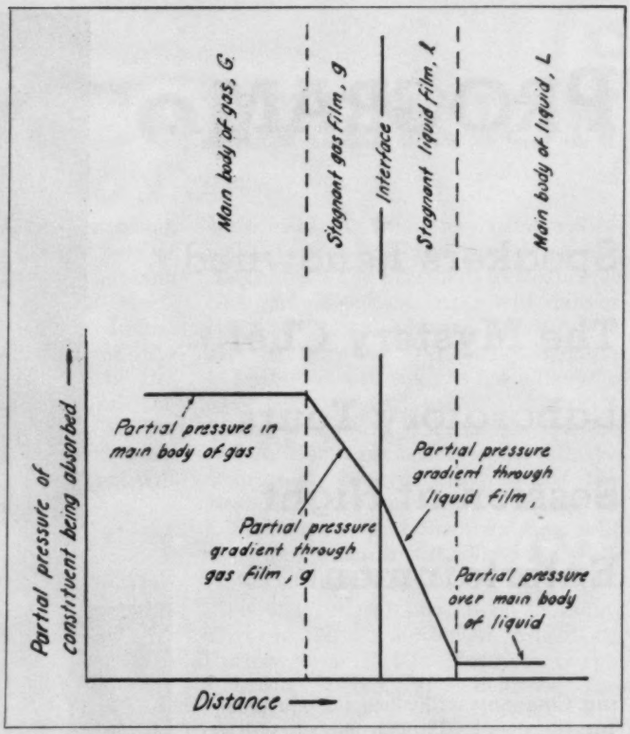

Main body of gas, G
Stagnant gas film, g
Interface
Stagnant liquid film, l
Main body of liquid, L
Partial pressure of constituent being absorbed
Partial pressure in main body of gas
Partial pressure gradient through liquid film, l
Partial pressure gradient through gas film, g
Partial pressure over main body of liquid
Distance

FIG. 2. Film conditions in gas absorptions.

CONCERNING GAS SCRUBBING

"SCRUBBING" seems to be a general term referring to the process of the removal of a foreign substance by vigorously contacting it with a liquid, usually water. It is an operation frequently encountered in early childhood. In the gas industry "scrubbing" may refer to a number of things: it may be the removal of dust from blast furnace gas by a water spray or it may be the elimination of H_2S by a soda ash solution from manufactured gas. This paper will confine itself to a discussion of underlying principles of that kind of scrubbing where certain gaseous constitutents are removed from the main gas phase and transferred either by chemical reaction or physical absorption to a liquid. Almost every chemical industry utilizes this operation or some of its modifications.

The first requisite of a successful scrubbing process is that the equilibrium conditions must be correct: that is, the constituent to be removed from the gas must be highly soluble in the liquid used and the other constituents of the gas must be highly insoluble. Whether the solubility is due to a physical absorption or a chemical combination is of minor importance; it is the equilibrium conditions that determine the operation. In a liquid purification system where H_2S is removed by soda ash solution, the sulfide gases are very soluble in the liquid but the CO and H_2 of the gas are soluble only to a negligible extent. Hence, if the gas is brought in adequate contact with the solution, the H_2S will rush into the liquid, leaving the other gaseous constituents behind. Moreover, after the sulfide gas gets into the liquid it shows but small tendency to come back out, that is, its partial pressure over the solution is very low until a relatively high concentration has been built up. This low back pressure of the absorbed gas is generally characteristic of very soluble gases, such as ammonia or water vapor in sulfuric acid solutions, carbon dioxide in soda ash, or benzene in oil.

If equilibrium conditions are right the problem of scrubbing them becomes one of providing sufficient opportunity for contact between the gas and liquid phases.

Whenever there is a transfer of material from one phase to another there must necessarily be some sort of driving force to send the material along its way. Everyone is familiar with the concept that heat flows from a given temperature to one which is lower. The temperature difference is the driving force of heat transfer. The analogous driving force in gas absorption is the partial pressure of the constituent being absorbed. As long as the partial pressure of material in the gas phase is greater than the partial pressure of that same constituent over the solution or liquid, absorption will take place, and usually the *rate* of absorption is directly proportional to this difference in the partial pressure between the two phases. Obviously, the amount of material transferred between the gas and the liquid in a given time will also be proportional to the extent of the interfacial area between the phases. It is also self-

By C. C. FURNAS

Associate Professor of Chemical Engineering, Yale University, New Haven, Connecticut.

evident that if material is being transferred from the gas to the liquid at any finite rate there is some sort of a resistance to this transfer. The magnitude of this resistance depends upon the chemical and physical character of the system and can only be determined by experiment. This is the item which has received most of the attention of the researchers.

These ideas of the controlling factors of gas absorption are summarized by the simple general equation,

$$\frac{w}{O} = k A \Delta P_m$$

where

w/O = mass of material transferred from gas to liquid in a unit of time.

k = coefficient of transfer commonly measured in lb. of material transferred per hour per atmosphere partial pressure difference. (This is the reciprocal of the resistance to transfer.)

ΔP_m = average or mean partial pressure difference (usually measured in atmospheres) of the material being transferred, in the gas and liquid phases.

A = the amount of area of interfacial contact of the two phases.

This equation, which is exactly analogous to the one used for heat transfer, is perfectly general. Any set of units may be used, as long as they are consistent throughout. The evaluation of ΔP_m, the *average* partial pressure difference, is subject to considerable variation in interpretation and will be discussed later.

By inspecting this equation it can be seen that when a constituent is being transferred to a liquid at a rapid rate it may be because (1) the transfer area is large, (2) the partial pressure difference between the phase is great, or (3) resistance to transfer is low, i.e. the reciprocal of resistance, the transfer coefficient, k, is large; or it may be due to any combination of these factors.

To have a complete understanding of either the design or the operation of gas absorbing equipment it is necessary to go a little more deeply into the make-up of the resistance to transfer. Again it will be advantageous to draw upon the analogy to heat transfer. When a hot liquid moves through a metal tube made of some highly conductive material such as copper, the resistance to heat transfer does not reside in the metal wall but in a thin film of liquid clinging to the metal surface. The thickness of this film can be cut down by increasing the rate of liquid travel, so increasing the liquid flow increases the rate of heat transfer, usually as about the 0.8 power of the liquid velocity. Likewise, when a liquid and gas are in contact and a constituent is being transferred, there is a stagnant film of gas next the liquid which offers resistance to the movement of material through it. Returning to the heat transfer analogy; if there is a thin-walled double-pipe heat exchange with a hot fluid on one side of the central tube and a cold liquid on the other, there are two films in series which offer resistance and through which heat must be transferred. Decreasing the resistance of one film by increasing its velocity then has no effect upon the resistance of the film on the other side of the wall, though the *overall* resistance to transfer through both films may be decreased by decreasing the resistance of one. The film and temperature gradient conditions of this set-up are shown as the cross-section of a double-pipe exchange in Fig. 1.

THE REVIEW of gas scrubbing principles by Professor Furnas, which is herewith published, was presented before the Technical Section of the American Gas Association at the Annual Convention in Cleveland, Ohio, September 27 to October 1, 1937. —Editor.

The film conditions in gas absorption are exactly analogous to those of the double-pipe heat transfer equipment. In place of the thin metal pipe wall there is the infinitesimally thin interface between the gas and liquid phases. On the gas side of the interface there is a stagnant film of gas which resists the transfer of material and on the liquid side of the interface there is a stagnant film of liquid which resists the transfer of material. The film conditions and partial pressure gradients through such a system are shown in Fig. 2.

It often happens in both heat exchangers and gas absorbers that the

(Continued on Page 112)

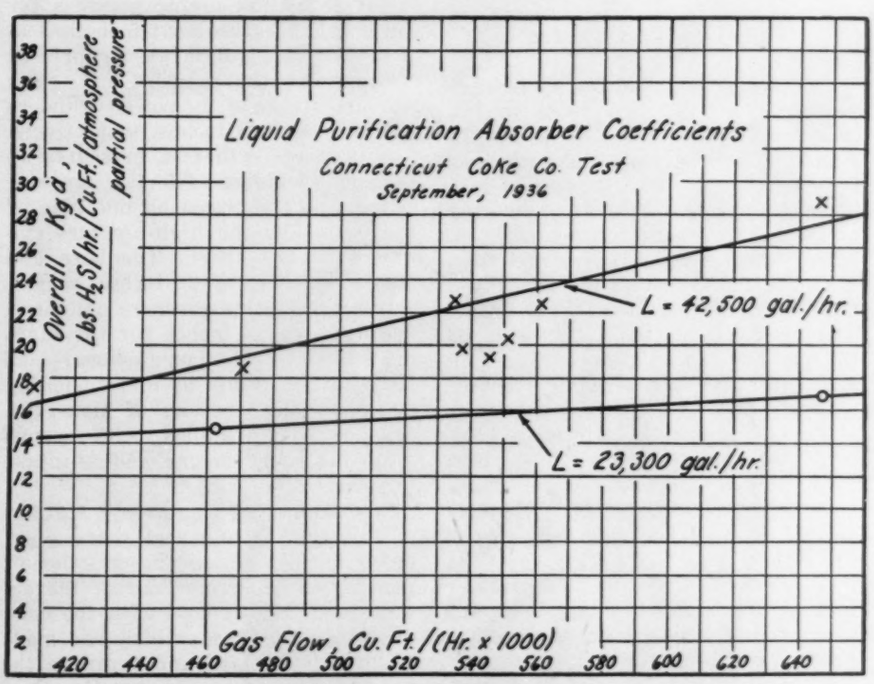
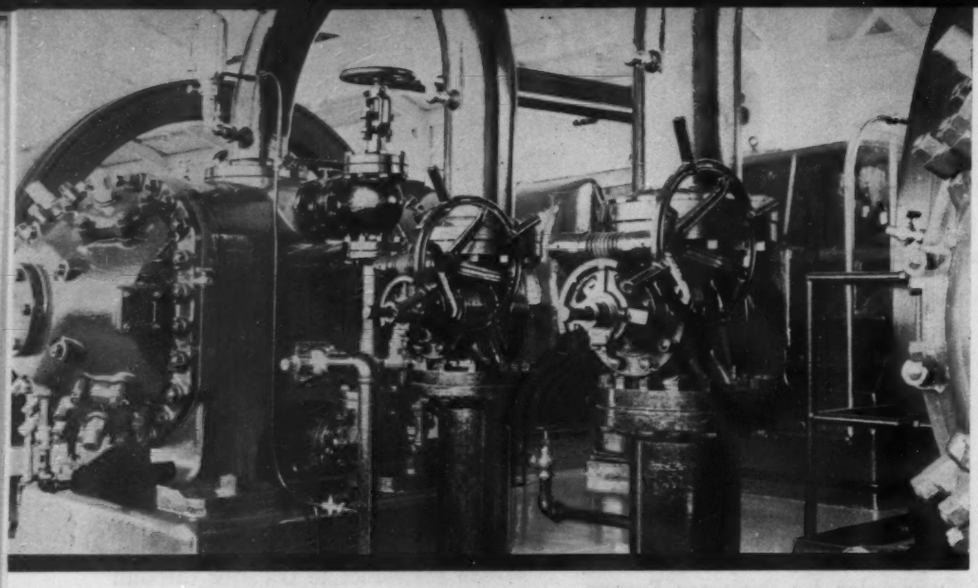


FIG. 3. Liquid purification absorber coefficients.



Worm and sector operated control Nordstrom plug valves on the intake of Cooper-Bessemer twin tandem compressor cylinders in the United Gas Public Service Co.'s Rodessa station.

BUILDING CO.'S

By J. C. ALBRIGHT
Staff Correspondent

DURING the development of, and the subsequent extension to the Rodessa oil field in Louisiana and Northeast Texas, production of large volumes of gas was made available on mineral and gas leases owned and controlled by the United Gas Public Service Co. The conditions in the field required that the company lay an extensive gathering system and build a completely modern compressor station. Two systems were merged into one at the time of construction; one called the Texas system, and the other the Louisiana system. No great difference is to be observed on either side of the field, but the names were applied locally to indicate that gas was handled from two states through a common compressor station.

Pipe Line Construction

The largest pipe laid for trunk lines leading from the two fields to the compressor station was 24 inches in diameter, with laterals and gathering lines ranging downward from 18 to 4 inches. Individual wells connected to traps and separators required the smallest size pipe, as flowing pressures are sufficient to deliver the gas to the main trunk lines through such pipe. Gas produced on the Texas side of the field flows in an easterly direction, and Louisiana gas flows in a southwesterly direction to the compressor station. Field gas is stripped as completely as practicable of all liquids, consisting of condensed water vapor and gasoline drips, in advantageously located field scrubbers on each side of the station.

Construction on the compressor station was begun in June, 1936, and completed for operation during the first quarter of 1937. The location selected for the station was in the southwest quarter of section 29-23-16, Caddo Parish, Louisiana, about one-fourth mile from the Cass County, Texas, line. The location placed the station and accessories on the side of a sandy slope, which provides excellent drainage, while the type of surface and subsoil permitted rapid and easy excavation for the basement and foundation pits. Dirt taken from the subsurface was leveled to a uniform grade, and grass planted to prevent blowing of dust and to provide a more pleasant surrounding for the unit.

Eight 1,000-horsepower, horizontal twin-tandem, double acting four-cycle gas engines were installed on the heavy concrete foundations, using cross-tie cribbing to move the 35,000 lb. bedplates from the trucks to the template bolts. The construction of this type of gas engine provides for power cylinders, horizontal, on one end of the bedplate and the gas compressor cylinders on the opposite end. The bore and stroke of the power cylinders are 21½ and 36 inches, respectively. Low-pressure — that is, pressures up to and including 175 lbs. gage — cylinders were placed on one side of the twin, and the high-pressure cylinders on the other. The bore and stroke are 20½ by 36 inches, respectively, for the low-pressure cylinders, and 12½ by 36 inches for the high-pressure side. Discharge pressure can be maintained up to and including 500 lbs., using the size of high-pressure cylinder installed, with normal temperature on the gas, and an intake pressure of 175 lbs.

When building compressor stations of this type during past years, operators have followed the practice of pouring the concrete floor of the engine room almost level with the compressor yard grade, which has made it difficult to light and ventilate the basement properly. United Gas Public Service Co., however, when building the Rodessa compressor station, elevated the floor well above the ground level so as to take advantage of natural lighting, as well as efficient circulation of air through the alleys between the engines to prevent an accumulation of exhaust and other obnoxious gases. By including large aisles and other spaces in the basement, all piping not essential for overhead location was laid in the basement, out of the way of men working around the plant. Exhaust piping was built into the engine foundations, and these pipes extend, with the air intake lines, through the walls of the basement, thus providing sufficient head room. Gas intake and discharge piping were brought down from the compressor cylinder stools and flanges through pipe bends to the floor of the basement, then through the walls to the headers outside the building. The conduit for lighting the basement and engine room proper was placed beneath the floor joists with the usual type of carrier hooks.

Building Made of Steel

The main building, housing the engines and compressors, was constructed principally of steel, the exception being a low brick wainscot, or wall, between the concrete floor and the lower line of window openings. The building measures 230 ft. in length, 70 ft. in width and is 20 ft. high. The center of the roof is supported by steel posts set on a stringer or beam running the full length of the building. The center member serves both as a roof support and as a support for one side of the track upon which the two traveling cranes, which are used to handle the heavier parts of the machines, operate. One crane was placed over the bedplate of the engines and the compressor end of the machines,

UNITED GAS PUBLIC SERVICE RODESSA COMPRESSOR PLANT

the other over the power cylinders.

The intake valves, used to pinch the load of the engines when it becomes necessary to shut off the incoming gas entirely, were placed in the suction lines between the cylinder flanges and the opening where the piping passes through the floor. Spoke wheel operated, worm-and-gear type lubricated plugs were used exclusively at these points. Discharge controls were placed above the engine room floor, using stands with wheels which were attached to the shafting connected to other plug valves in the piping below the floor. All plug valves have flanged ends, which facilitates removal for inspection and cleaning.

Gas for Engine Fuel

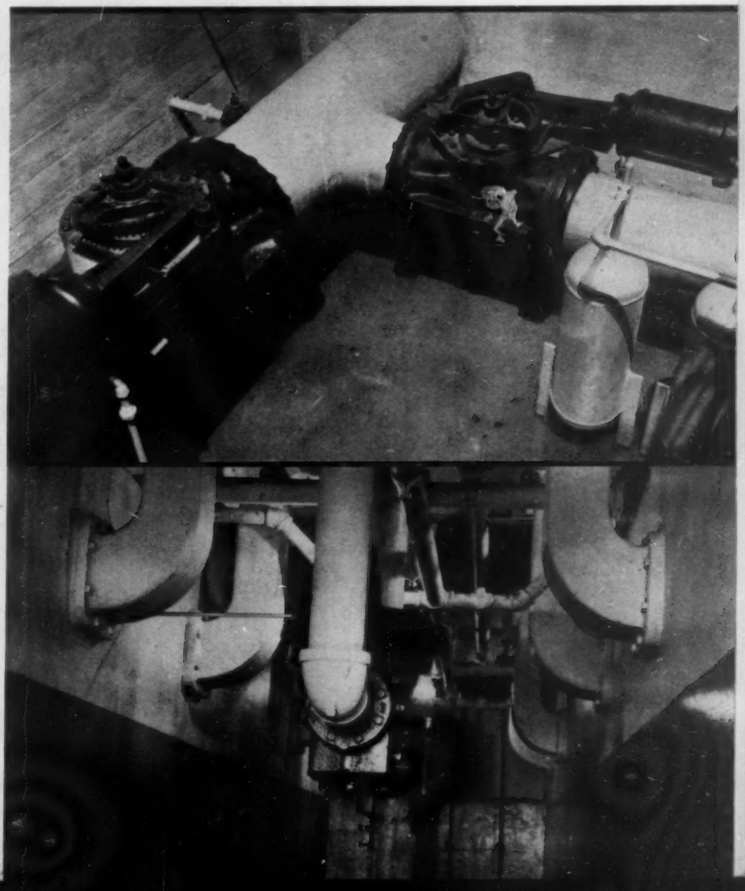
Gas for engine fuel is taken from the main line residue carrier, which returns from the Myrtis gasoline plant, paralleling the 16-inch transmission gas line. Fuel is removed from this line at the boundary of the compressor room grounds and passed through a scrubber from which it enters the reducing instruments at the building. Individual fuel regulation is obtained with equipment installed in the basement with lines leading to the mixing valves on the power cylinders. Condensate, which may return with the stripped, residue gas is removed from the plant fuel in the scrubber, and the condensate is taken care of through the operation of a steam trap installed on the fluid outlet.

Field pressures enable the gas to be passed from the traps and oil and gas separators in the field to the gathering system so the compressor station will obtain an intake pressure of about 50 lbs. gage. Under present conditions surrounding production, water vapors and heavier fractions of petroleum in the gas will naturally condense in the laterals and main transmission lines of both the Texas and Louisiana sides of the system. Vessels, varying in size, were installed at the low points of the main 24-inch lines to accumulate the drips to prevent congestion of the system with fluid. The usual method of connecting the drips to the lines was followed, but the end of the drips most remote from the trunk line was included in a concrete-lined pit. Liquid level controls were attached to this end of the vessel, which operates through remote control. A reciprocating piston pump was set on concrete piers on the top of the wall of the pit. Fluid lines were connected to both the drip outlet and the suction of the pump, so that when sufficient fluid collects in the drum, the pump is automatically started. High-pressure gas piped back to the producing leases for fuel parallels the main lines, and connections were made for power to operate the pump.

Liquid lines were laid in the ditch with the main gas and residue lines to carry the fluid from the pump-operated drips to the compressor station. Large capacity lubricators were installed on these drip pumps so the line walker would not be required to service them each day, and each pump was inclosed in a refinery-type woven wire fence with barbed wire guard at the top of the posts to prevent unauthorized persons from tampering with the equipment. The fluid line paralleling the Texas gathering system terminates at a large horizontal storage tank on the east side of the compressor grounds where the liquid handled by the drip pumps is received. A predetermined back-pressure is maintained on the drip line with an automatic diaphragm valve which opens as the pumps build up more pressure than is normally carried on the line while idle. So that excessive pressure will not be built up on this line, a relief valve was installed near the diaphragm valve manifold, which leads to plant drains. Fluids will flow through this vent if the automatic back-pressure valve becomes inoperative.

Louisiana Gathering System

The Louisiana side of the gathering system was equipped with a different type of drip control, but the vessels installed for collecting the liquids are similar to those used on the Texas side. A liquid transfer line parallels the 24-inch Louisiana line, as well as the residue fuel gas line,



PLUG VALVES
Hydraulic-operated Nordstrom plug valves in the United Gas Public Service Company's pipe lines at Rodessa, La.

BASEMENT
At right is shown the accessibility of the piping and various units in the full basement at the Rodessa compressor station.

This view on a section of Panhandle Eastern's new 24"-22" looping construction shows how Dresser Couplings eliminate the "human equation." Simple, fool-proof parts are merely assembled on plain-end pipe by unskilled workmen, using only one tool—a wrench.

DRESSER COUPLINGS

by side with Gas!

Panhandle Eastern's New Expansion Project Employs 51 Carloads of Dresser Couplings

Again, the flexibility of Dresser Couplings receives important recognition—this time, in the year's outstanding program for the expansion of natural-gas service.

The use of more than 17,000 Dresser joints on the new looping project of Panhandle Eastern Pipe Line Company, is evidence anew that the advantages brought to pipe-line construction by Dresser Couplings—flexibility, speed, ease of installation, strength, economy, and permanent tightness—are as essential today as they were fifty years ago. • S. R. Dresser Manufacturing Company, Bradford, Pa.

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HERE, THERE, EVERYWHERE—IMPORTANT GAS LINES ARE BEING DRESSER-COUPLED

11,000 Dresser joints were used on this important 22", 230-mile extension from Zionsville, Indiana, to Detroit.

Completely Dresser-coupled is this recently constructed 36" gas main in one of Illinois' largest cities.

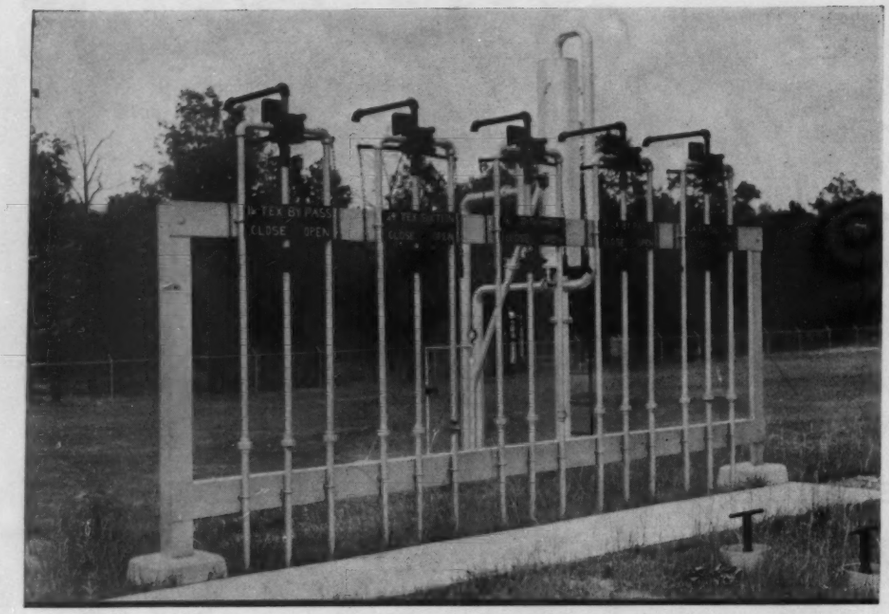
From Hugoton to Mullinville, Kansas, runs this 20" gas line, on which more than 7,000 Dresser joints were used.

This 40-mile gas line in London, Ontario (8" and 10" in size) augments a previously built line, also completely Dresser-coupled.

On this 6", 100-mile gas line in central Nebraska, approximately 11,000 Dresser Couplings were used throughout.

To connect gas wells to a transmission line is the purpose of this 6" all-Dresser-coupled line near Huntington, W. Va.

Dresser flexible Couplings were used at every joint on this 103-mile, 12" gas line over the mountains of western Pennsylvania.

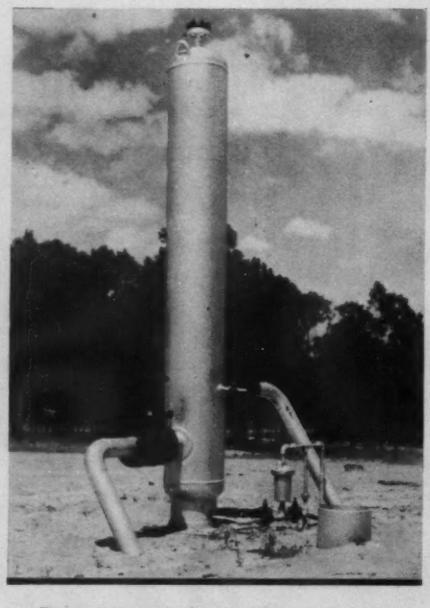


Remote control valves in the hydraulic system installed to handle lubricated plug valves at a distance at the Rodessa gas gathering and compression unit.

and in addition to these carriers, a separate two-inch line was laid in the ditch for pressuring the drips at varying times by manual control. At regular intervals, determined by the amount of liquid condensed in the line, an operator at the plant opens plug stops in the pressure line which allows gas under a pressure of 175 lbs. to flow into the drip vessels. Swing checks were installed on the connections at such an angle that when the higher pressure enters the vessels, they will instantly close so that sufficient pressure will drive the liquid from the drips. The liquid transfer line is controlled at the station receiving tank, and when the line is opened, the fluid enters the receiving tank with the other drips collected. An automatic pressure regulator prevents more than the required pressure to be built up on the Louisiana drips, and when all of the fluid has been received, the gas supply is cut off by closing the stops on the control manifold. The liquid line is then vented by opening a blow-off line which returns the operation of the vessels on the 24-inch line to normal pressures.

When the receiving tank becomes full of gasoline, water being drained off as it is received, the drips are pumped through a three-inch pipe line to the Myrtis gasoline plant for processing. There have been times when the condensed gasoline vapor received as drips is white and of a color sufficiently high that the liquid may be blended with the regular production of natural gasoline, but at other times contamination is encountered due to spraying oil pulled over from the oil and gas separators. Under this latter condition it is necessary for the gasoline plant to rerun for end point and color characteristics.

By the installation of this gas cleaning apparatus, it is apparent that no difficulty will ever be encountered with wet gas being brought into the suction side of the compressors. Suction is taken directly from the 24-inch header, which is connected to large plant scrubbers where the main trunk lines enter the plant grounds. Gas handled by the low-pressure cylinders is transferred to atmospheric type cooling sections installed in an aerator type cooling tower to reduce the temperature of compression as low as possible. Accumulator tanks were set at the outlet of the low pressure cooling sections to catch and accumulate what distillate may be condensed in the cooling sections. The high-pressure cylinders take this gas at compression pressure and boost it to 450 lbs. The gas returns to the cooling tower to pass through a similar section of cooling coils which are also connected at the header outlet to scrubbers. Considerable condensate is accumulated in these scrubbers, as the compressor plant acts somewhat like a compression gasoline plant, and the liquefied petroleum products are blown to the liquid receiving tank which carries the pipe line drips.



Gas engine fuel scrubber which is kept free of liquid gases and water by the Armstrong steam trap at its base.

The cooling tower is 175 ft. in length and 52 ft. high. A concrete basin was built to contain the water flowing down through the tower; from this the pumps take suction for recirculating. The tower was placed pointing east and west as the prevailing winds are usually from the south during the periods of the year when cooling of water is most essential to efficient operation. Water used in this cooling tower is produced on the premises from deep wells by gas lift. Both domestic and plant waters are produced from these wells, which discharge into a concrete lined receiving tank for desedimentation by precipitation. Circulation of the cooling water over the louvre is obtained by motor-driven centrifugal pumps in the auxiliary room. The pumps are set in a concrete-lined basin to obtain flooded suction from the supply reservoirs. Cooling water for the engines is picked up by some of these pumps and discharged at low pressure through the jackets where it emerges at atmospheric pressure. It flows unrestricted through the usual type of conductor funnel connections to a second pit, or hot well, to be picked up again and pumped over the louvre tower for cooling again.

After the gas at 450 lbs. pressure leaves the high-pressure cooling coil scrubbers, it enters a single 18-inch transmission line which leads to the Myrtis gasoline plant for complete extraction of the desirable fractions left in it after passing through the high-pressure system. Leaving the high-pressure absorbers, it flows through a company transmission line to other lines and distribution systems for ulti-

(Continued on Page 38)

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● On services particularly, connections have to be quickly and simply made, and most of all, reliable. In more ways than any other joints, Dresser *flexible* Style 38 Service Couplings give you these qualities. They simplify your work amazingly, insure uninterrupted performance because:

1. CONNECTIONS ARE PERMANENTLY GAS-TIGHT, especially on high-pressure work, as proved by the thousands of Dresser joints that have been used as standard since 1880. Joints "ride" with the line. Pipe ends have full thickness—there are no threads to corrode through. Coupling can be assembled in only one way—the *permanently tight way*. Under actual test, Dresser Service connections have been deflected over 100,000 times, through a 4° arc, at 100 lbs. per sq. in. pressure, with no sign of leakage. Says one customer: *"To date we have never had a leak on one of your couplings that we know about and we have installed thousands over the past ten years."*

2. STRESSES and pipe leverage at main or in service resulting from expansion, contraction due to frost, soil settlement, traffic shock, vibration, careless backfilling of adjacent water or sewer services, etc., are *absorbed*, preventing the failures that often occur in rigid service joints or in rigid tees, ells, or saddles at main. A Dresser *flexible* connection is especially recommended about 18" from the main. Says one customer: *"Although temperature reached 31°F. below and frost was well below our lines, no breaks occurred. We can attribute this fact to the number of Dresser Couplings used. During the winter some of our neighboring companies suffered severe losses and expensive repairs."*

3. SPEED OF JOINT-MAKING, a very important factor on reconnections or under pressure, is remarkably fast, requiring only two or three minutes. Joints come completely assembled. All you have to do is stab in the *plain-end* pipe and tighten the nuts.

4. SIMPLICITY AND EASE OF ASSEMBLY save all around. Ordinary labor installs. One tool only,—a wrench—is required. There is no rigging up of complicated installation apparatus, no "human equation." Plain-end pipe is used, eliminating threading both in shop or in cramped quarters on job (as near a wall). Wet ditch or bad weather need not halt work. Body of coupling spans variations in space between pipe ends, giving a "come and go" that makes exact pipe lengths unnecessary. Every connection is its own union. You get a good joint on the first attempt every time. Says one customer: *"In my 28 years' experience as service man and foreman with our local gas company, I have never found anything quite so handy for service lines as the Dresser Coupling."*

5. SAFETY from explosive hazards is inherent. There is no flame, no torch. Joints can be made under gas pressure.

6. SLIGHT MISALIGNMENTS of pipe with street tee, etc., (as when pipe is pushed through with a driving jack) are easily absorbed.

7. SALVAGE and demountability of joints permit re-use on other lines.

(Above, Top) 1¼" I. D. Dresser Style 38 Service Coupling, showing 2-bolt construction supplied for sizes from ⅜" I.D. to 2" O.D. incl. (2" I.D. has 3 bolts). Middle-ring length is 3½" for ⅜" and ½" I.D., 5" for other sizes.

(Above, Right) Longitudinal section through Style 38 Service Coupling, showing how it joins plain-end pipe in a flexible yet permanently gas-tight connection. All parts are standard and accurately manufactured within close limits.

8. LOW COST is made possible through savings on time, elimination of threading and repairs, salvage, long service, etc.

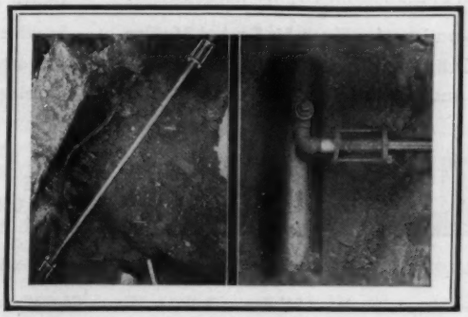
REPAIRS, RENEWALS, ETC.

Another important advantage of Dresser Style 38 Service Couplings is their usefulness on repairs, renewals, etc. Because they are union-type and easily demounted, they are most handy for:

1. *Renewals of defective or corroded services.* The replacement pipe (or valves, tees, and crosses) is quickly cut in, eliminating unions and threading in ditch, and reducing size of excavation to a minimum. (Couplings on either side of valve or fitting also prevent stresses on body.) 2. *Speedy reconnections*—made necessary by (1) some line disturbance as from a pick, grader, or ditch-digger, or (2) after service is cut for ditch-digger—reduce time consumers are without service. 3. *Changing over services* when a new main is laid. 4. *Replacement work* ahead of new permanent pavements. 5. *Closing line* opened to remove rust stoppage. 6. *Connecting stub services* laid ahead of paving. 7. *Connecting services with property owner's line* if either one is installed ahead of the other. 8. *Replacing defective screw joints.* Collar may be cut in two, picked off, and pipe ends tied together with a Dresser. 9. *Reconnections* at curb where cut off for some reason, or where a longscrew or union would be used. 10. *Enclosing small leaks* in barrel of pipe. 11. *Making extensions* to small mains. 12. *Relaying services* in new location.

HOW TO ORDER

Specify: (1) quantity; (2) nominal size and O.D. of pipe; (3) style number; (4) whether couplings are to be black or galvanized; and (5) service—natural gas, manufactured gas, etc.



(Right) When part of a service has to be replaced, the new pipe can be cut into the line quickly and easily with Style 38's, which act as unions and eliminate threading.

(Extreme right) A style 38 installed within 18" of main prevents failures in swing joint by absorbing stresses due to movement of either service or main.

FREE SAMPLE

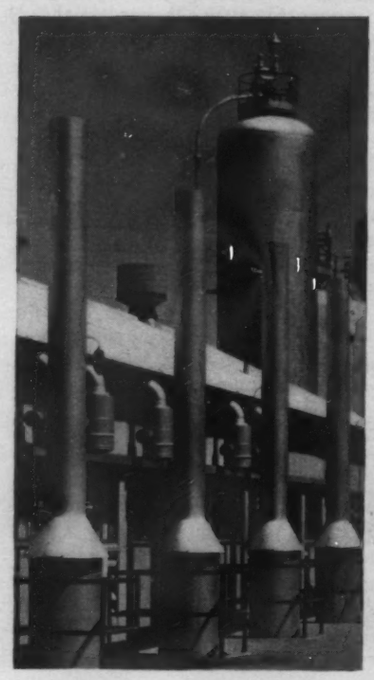
Write for free sample of Style 38. Simply specify size. No obligation. Information and prices on complete line of other Dresser Service Fittings also furnished promptly.

S. R. DRESSER MFG. CO.

BRADFORD, PA.

In Canada: Dresser Mfg. Company, Ltd., 60 Front St., W., Toronto, Ontario

NO. 1 IN A SERIES OF ADVERTISEMENTS ON DRESSER PRODUCTS FOR SERVICES



Fluor Air-Cooled Mufflers reduce compressor plant exhaust noises to a minimum. They're quiet! Fluor Air-Cooled Mufflers effect cooler stack, room and floor temperatures. They're cool! Expenditures for water as a cooling medium and the attendant expense of cleaning scale-caked exhaust lines are eliminated. Also, complete absence of steam vapor prevents corrosion of nearby equipment. Uniformly low back pressure permits development of maximum engine horsepower.

The operation of a Fluor Air-Cooled Muffler is simplicity itself. Exhaust gases are released within and below an outside stack. The explosive force of the exhaust induces a current of air through the air duct encasing the exhaust line. The current of air circulates around the exhaust pipe for its entire length. Velocities as great as 2000 cubic feet per minute insure positive engine room ventilation.

Fluor Air-Cooled Mufflers are available for all internal combustion engines for either overhead or bottom exhaust installations. Provisions are included in their design to utilize exhaust gases for heating buildings in which they are installed. Your request for Bulletin M-436, containing valuable engineering data, will receive prompt attention.

FLUOR BE SURE WITH FLUOR **AIR-COOLED MUFFLERS**

THE FLUOR CORPORATION, LTD. *Main Office:* Box 128—Station K, Los Angeles, Calif. . . . 909 McCormick Building, Chicago, Illinois . . . 703 Fairfax Building, Kansas City, Missouri . . . 934 M & M Building, Houston, Texas 710 Canadian Pacific Building, New York City, N. Y. . . . 719 McBirney Building, Tulsa, Oklahoma

Showmanship—

the new trend in Home Service

By KAREN FLADOES

Director, Home Service Department,
The Peoples Gas Light and Coke Co.

THERE is as much competition today for woman's attention as there is for her dollar. When home service activities first began, it was more or less an open field, unhampered by very much competition. The cooking schools in home service departments to which women were invited, without charge, to be taught newer methods of cooking were rather a novelty. To secure an interested audience was no very difficult feat. Women liked them.

KAREN FLADOES

Presently every manufacturer of foods, equipment, utensils—in fact, any one selling anything that went into the kitchen or dining room—began promoting the sales of these items through the medium of cooking schools. Today, women are offered dozens of opportunities every week to attend cooking classes. Organized women's groups are eternally being asked to sponsor this, that, or another endeavor because the assured backing of a leading group brings followers.

This has made women indifferent. With such a wide selection to choose from, many take no interest at all, or they pick that which offers most in the way of entertainment or of financial gain.

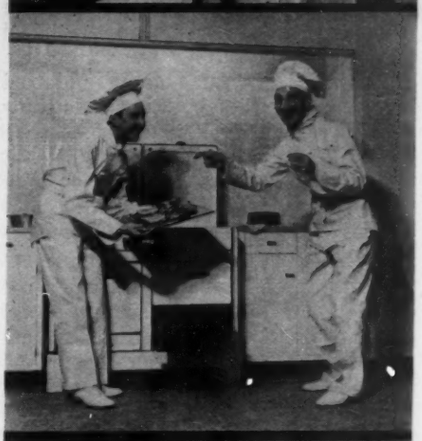
The routine cooking demonstration is as dead as a dodo and might as well be scrapped along with outmoded clothes—or perhaps, as sometimes must be done with outmoded clothes, remodeled.

There is no lessening of interest in foods, though food habits change. Though styles in figures might be expected to govern eating habits, generally those who discuss silhouettes most also have a powerful yen for good eating. We still have a large audience, receptive to interesting information on new cookery using modern appliances, but the information must be done up in a more attention arresting package; for, according to an old recipe, if you would have a rabbit stew you must first catch the rabbit.

Whether we like it or not, showmanship must be brought into our public performances. The academic approach is definitely out. This doesn't mean that it is at all necessary to clown through the act, but there is a middle ground between clowning and the heavy attitude of "the dreary round of three square meals a day." A middle ground too, where just as much sound information can be given—but given as though it was fun to cook (as it is); where the point can be just as convincingly made that food beautifully cooked can be as soul-satisfying as a beautiful symphony.

COLOR
A costumed miss prepares an Italian dish on International Day.

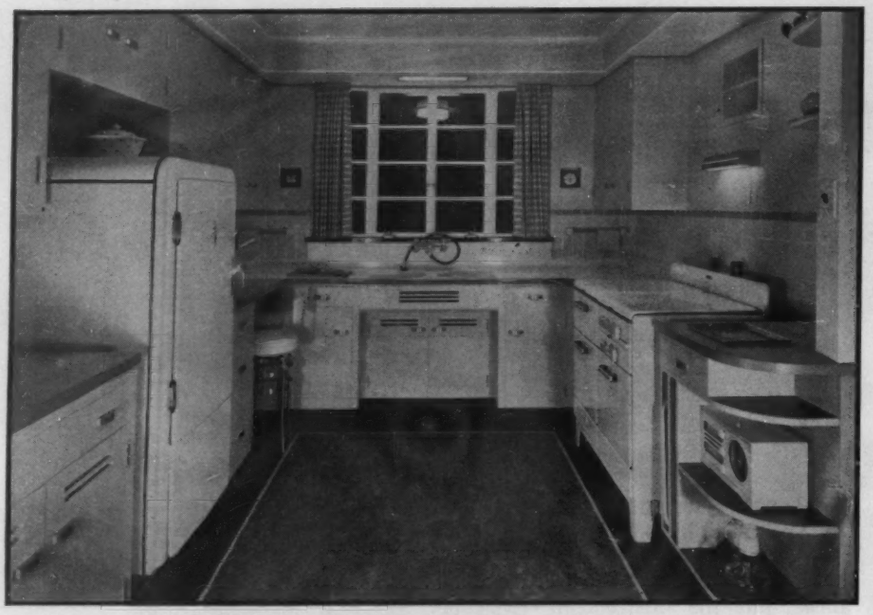
Demonstrations can be much shorter. The points we wish to make can be made in much less time than we are accustomed to using. There is much of value in the short sales-floor demonstrations. An attractive kitchen on the sales floor not only adds color and life to rather cold quarters but the audience is a constantly shifting one without bench warmers.



HUMOR
Two "chefs" demonstrate the preparation of steaks for broiling.

Most home service departments are aware of the necessity for change as evidenced by the dramatization of their demonstrations. More and more we know that we must combine showmanship with salesmanship, even though we are dressed as cooking teachers. We have

CURIOSITY
Women flock to see this six-year old, Barbara Jenkins, cook.



The Chicago company's all-gas model kitchen features bright colors and convenience as well as modern gas appliances. Utensil closets and appliances are placed conveniently near the work space in a compact, modern setting.

all come to a realization that we have taken too much for granted. We have taken for granted that, by saying that gas is a clean fuel, women would believe it, when nothing on earth could be dirtier than their antiquated gas ranges. We waited until our competitors came along and wiped the bottom of the saucepan with a clean towel to show how clean electrical cooking would be. We waited until a range salesman came along and tied a towel around the boiling pot to show that low flame cookery could be cool. These little tricks may seem silly, but are ever so much more effective than our best sales talk, no matter how lyrical we may grow over the merits of gas.

Perhaps we have even taken too much for granted in assuming that other professional women who are engaged in promoting sales of foods and utensils and who must use cooking appliances are as familiar as we are with the advantages of gas as a fuel.

It is with such a thought in mind that the Home Service Committee sponsored a four-day school at the American Gas Association Laboratories in Cleveland in June. It should be each home service director's responsibility to urge as many as possible from schools and colleges, as well as from the business field, to attend these sessions. It seems important to go a step further and hold meetings of this sort in the regional sales divisions to make it possible for a greater number of people to be reached without undue expenditure of money.

After overhearing the answer of a professional of high rating on a question of broiling, it is certain that we have a very definite responsibility toward these people. A few pertinent paragraphs on broiling would be welcomed by them and we could feel assured that the newest information was being given. The double boiler is still being used when we know that it is useless equipment with low flame cookery. Much other factual information which we find as we work with the new equipment year after year could be presented in attractive pamphlet form—not only to the housewives whom we reach, but, equally important, to others who are also trying to reach the women in homes in much the same manner as we try to do.

The lecture-demonstration once served to draw crowds. Today it must be called "Show," "Forum," "County Fair," "Carnival," "Style Show," with all the publicity, dramatization, and carnival spirit that can be injected into it.

Newspaper Schools

Newspaper schools have a definite use. What if they are attended for the prizes, as we often assure ourselves as a salve to conscience for not being in them? After all, only a few people sleep through them and it's up to us to make the most telling use of the time and audience at our disposal. Not to teach them how to cook, but how to use equipment.

Special shows, of course, can not be continuous performances. Even though cost would permit it, our customers would again become surfeited. The periodical jamboree serves to keep attention focused on our companies. It infuses new enthusiasm into home service departments. It knits together more closely the advertising, the sales, the publicity, and the home service departments. They're all in it; they're all vitally interested in putting over a good show.

The Rodessa Compressor Plant

(Continued from Page 34)

mate consumption at various points.

The auxiliary building near the west end of the main engine room is 81 ft. in length, 31 ft. in width and 20 ft. high; constructed of steel with a concrete floor. It contains the necessary engines and generators for supplying current to operate the motor-driven pumps and for plant and house row lighting. Additional equipment consists of a power lathe for emergency parts making, a power saw and grinders for keeping tools in condition. The plant office was located in the northwest corner of the building, where all records are kept prior to being sent to the division office in Shreveport.

Gas switching and control of flow through the system is obtained by operating hydraulic plug valves situated at various points in the receiving and discharge lines. A control rack, erected outside the buildings, is equipped with three-way valves for handling the valves by remote control. By-passing and direct control of the gas is obtained by this system, and clearly stenciled signs placed beneath each control valve insures that the operator open the correct control for the purpose.

The capacity of the plant, when operated at full load, is about 60,000,000 cu. ft. daily, taking gas largely from United Gas Public Service wells, as the volume produced from these properties is more than sufficient to load the station to capacity. Provisions were included in the original plan of the plant for an addition of engines as needed, and the necessary connections and plug valves were installed on the headers so that no interruption of the plant will be encountered when and if these engines are installed.

The Precision Method of Testing Gas Leaks

● **E. F. SCHULDT, The Peoples Gas Light and Coke Co., Chicago, Ill., in a paper, "The Precision Method of Locating Gas Leaks," presented before the American Gas Association's 14th Annual Distribution Conference in Washington, D. C., April 12-14, 1937. Mr. Schuldt's paper is included in the Distribution Committee Report to be presented before the American Gas Association Annual Convention in Cleveland, September 27 to October 1, 1937.—Abstract by G A S).**

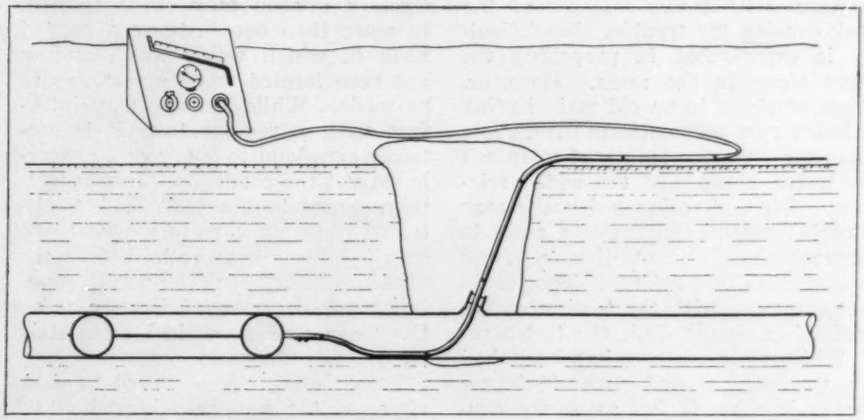


FIG. 1. An outline of the "Leak Locator".

THE instrument to be described has been named, "The Leak Locater". Through its use the main is tested section by section from the inside. All leaks, small or large, joint leaks, broken mains, holes corroded in mains or service leaks are definitely and easily located.

Fig. 1 shows "The Leak Locater" in outline. It consists of four parts, namely:

1. A flexible frame on which are spaced two modified rubber gas main bags. The bags can be inflated simultaneously using one side of a double stem on one end of a frame. The other side of the double stem extends through the adjacent bag to measure the pressure in the space between the bags.

2. A duo rubber or flexible metal tubing of sufficient length. One side of the duo tubing is used to inflate the bags; the other side to transmit the gas pressure in the main.

3. An instrument panel having an inclined water gage of extreme sensitivity; a spring gage to indicate the air pressure in the bags; and connections for inflating and deflating the bags. The instrument panel is connected to one end of the duo tubing; the other end of which is connected to the bag frame.

4. An oil-tempered steel rod used to propel the bag frame and tubing along inside the main. The rod is mechanically connected to the bag frame and is of sufficient flexibility to pass through a tap in the main and of sufficient stiffness to avoid buckling when pushing the apparatus along inside the main.

The entire apparatus is so constructed that it can be readily inserted in a 1¼-in. tap in a 4-in. main. It can be propelled along inside a main for a distance of more than 200 ft. from a tap hole. This makes it possible to survey more than 400 ft. of main from a test opening.

In testing for a leak, the bags are inserted in the main. They are spaced 9 ft. apart on the frame so they seal off about 2 ft. of main when they are inflated. The bags are inflated with a tire pump and make a seal with the inside of the pipe when under from 3 to 6 lbs. pressure, depending on the condition of the inside of the pipe. In a smooth clean main the seal is made at less than 3 lbs. pressure. The gas pressure is registered on the water gage as soon as the bags are in the main. When the main is sealed off completely by both bags and there is no leak in the pipe between the bags, immediate proof is provided by the action of the water gage that the main under test is tight.

When a section is tested, the bags are moved forward exactly 8 ft. (where a 9 ft. spacing is used between bags) to permit an overlapping of test lengths. This is important because otherwise a leak could be overlooked were a bag to rest on the leak while making a test. The bag could seal off a service opening for example, and the overlapping tests eliminate this possibility.

If a leak is isolated between the bags, the gage pressure drops as soon as they are inflated. To locate the leak within 6 in., the bags are deflated and moved half the distance between the bags. If they still straddle the leak, they are moved forward or backward by smaller increments until the rear bag just passes beyond the leak. The steel rod is marked and the measurement can be transferred to the pavement above the main.

On some occasions two leaks exist within the spacing of the bags. That is, a joint may be leading four or five feet from a service also leaking. In following the above procedure, the bags would not run out of the leak area by moving them more than the distance they are spaced. The far leak is then located in continued forward moves. To locate the other leak, the apparatus is pulled out of the leak area and the second leak is thus spotted by the front bag.

With the equipment now being used, an average of 150 ft. of main can be tested in each direction from a tap hole. When looking for a leak, the preliminary survey should be able

TABLE NO. 1. ANALYSIS OF RESULTS OBTAINED WITH "LEAK LOCATOR"

No. of tests made	112
Lineal ft. of main tested	17,031
Av. ft. of main tested per test	152
No. leaks located	162
Av. distance from leak to test point (in feet)	46
No. tests, no leak found	11
No. tests, one leak found	75
No. tests, two leaks found	10
No. tests, three leaks found	7
No. tests, more than three leaks found	8

Cause of Leak	No.	Av. Dis. From Test Tap
Broken Main	32	33 ft.
Services Leaking	80	55 ft.
Stubs Leaking	21	39 ft.
Leaking Main Jts.	27	42 ft.

to come within this distance of the leak causing the trouble. No difficulty is experienced in propelling the bags along in the main. However, when working in an old main having a heavy rust accumulation inside, less than the ordinary length of main can be tested because of the added friction. Tar and resinous deposits may also be encountered inside a main to prevent the full test distance from being negotiated. These deposits do not interfere with the testing of the main, but simply limit the test area.

While some success has been had in working around two 45-degree bends in a main, full assurance cannot be had that the bags will pass an offset in the main. Likewise, other obstructions may limit the length of the test area. A line drip or sometimes a syphon may cause trouble. In more than one instance a sagged main in which water was standing has been located when a test was to be made. While the sag may interfere with a regular test, it is certainly beneficial to locate and properly correct the condition. Just recently a complete stoppage had to be traced down on a main known to be supplied from both ends, before the "Leak Locator" could be used. A refrigerator line crossed directly under the main and frost had completely stopped up the main.

Table No. 1 was prepared to show some of the results achieved while using the "Leak Locator" in the last nine months. The instrument was used on many other jobs with equal success.

Public Relations Pointers For Building Good Will

● **BLACKWELL NEWHALL, The Philadelphia Gas Works Co., Philadelphia, Pa., in a paper, "Management's Customer-Relations Job," presented at the annual convention of Pennsylvania Gas Association at Skytop., Pa., May 4-6, 1937.—(Abstract by GAS).**

IN establishing a satisfactory public relations set-up, the first thing management must do is decide what the general policy on public relations is to be. Here is a suggested policy: Give the maximum of service to each and every customer with minimum cost and required effort on that customer's part. This last is important. The required effort on the part of the customer in all contacts must be kept at a minimum.

Having fixed the public-relations policy, the next step is to determine who is going to be in charge of this work and the public-relations factors. Is it to be the function of all department heads or is it to be a special public-relations department?

Inside contacts should be made with care as well as those on the outside, because an excited or upset employee is a liability. One cannot mechanically shut off feelings aroused by an argument with a fellow employee. The customer who is contacted a few minutes later is bound to bear the brunt of this emotional hangover.

Management should have a public relations representative as the person to contact newspaper and radio people in case of an unforseen event. It is essential that the company's side of the situation appears at the same time the other side is printed or told. This executive should have occasional contact with both newspaper and radio people in order that each may get to know and trust the other, so that when time is short and need for exchanging knowledge is great, everything will go smoothly.

Other contacts are also important. Management should ask its employees to become well known and well acquainted in the community, so that when some difficulty arises the person seeking a remedy will come to us with his problem. Likewise, management should see that employees get to know the people who lead organized bodies of all sorts.

Experience has shown that customers may be divided into four major groups, viz:

1. Those who must be guided and helped in their business transactions.
2. Those who are easily satisfied, accept errors as a matter of course, and are blessed with dispositions willing to co-operate.
3. The group that is somewhat combative, meets explanations with doubt, and assumes a belligerent attitude toward any suggestion or recommendation. Difficult to win co-operation.
4. The radical group. Always dissatisfied with work, explanations about detail, very hard to handle due to their entire lack of consideration for the other fellow. Impossible and non-cooperative.

Each class should be recognized. No. 2—those easily satisfied—should be appreciated, but it is well to work toward getting the best results from the radical group. We should *anticipate* needs, because if trouble is headed off before a situation becomes acute, we have accomplished something that subsequent explanatory calls by the head of a division, district manager, or other representative fail to do.

If one of your customers makes a complaint and you find that the company is in error, do you yield at once? When wrong, yield quickly and graciously.

In this connection, management should stand back of employees when they are right. The employee should first be trained so that he can properly represent management, and if the employee is correct in making a statement to a customer, management should support his stand.

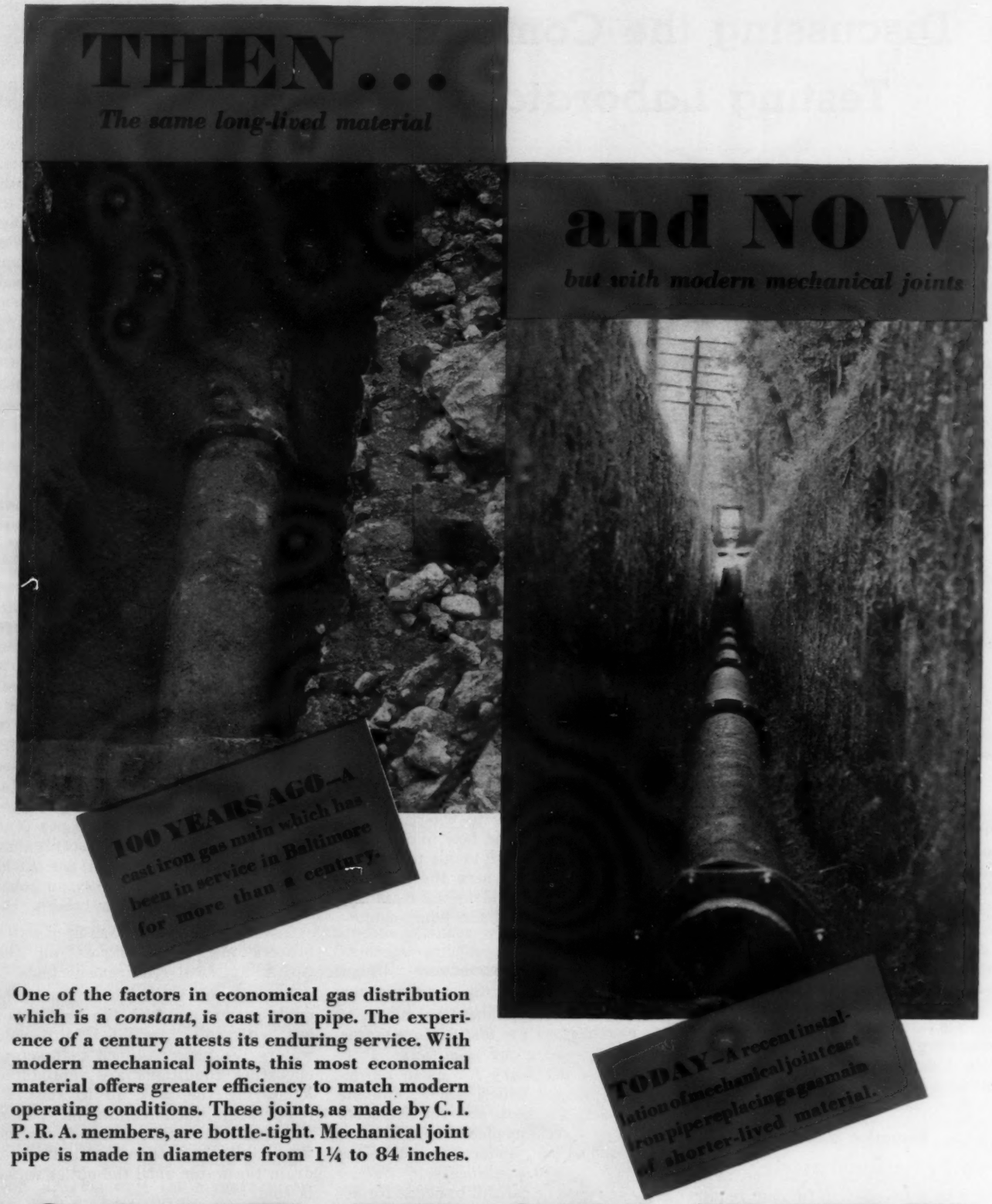
Management could improve public relations by seeing that rules and regulations are formulated with enough flexibility to aid development of sound common-sense ideas and to allow for cases that may require non-routine handling.

Some customers think all they have to do is to get in the front office to obtain anything they want. Such individuals should be allowed prompt access to the highest authority. They will get there in the end, so it is useless to try to restrain them. Even if they don't get all they ask for, they are comparatively happy that they've met the "head man."

An important public-relations problem is the handling of applicants for employment, because, unless management takes the stand that every consideration and sympathy should be given to an applicant, he or she is apt to go away from the company bearing ill will.

An important part of a customer-relations program is keeping up to date on public reaction. An occasional survey by a group of contact people, actually going to customers' homes, will indicate present trends of what customers are thinking about the company.

Management should see that proper facilities are available for visits to the gas company by groups of customers so that they may feel a closer tieup with the company through having actually seen the preparation of a bill, making gas, or some other company operation.


THEN . . .
The same long-lived material
100 YEARS AGO—A cast iron gas main which has been in service in Baltimore for more than a century.
and NOW
but with modern mechanical joints
TODAY—A recent installation of mechanical joint cast iron pipe replacing gas main of shorter-lived material.

One of the factors in economical gas distribution which is a *constant*, is cast iron pipe. The experience of a century attests its enduring service. With modern mechanical joints, this most economical material offers greater efficiency to match modern operating conditions. These joints, as made by C. I. P. R. A. members, are bottle-tight. Mechanical joint pipe is made in diameters from 1¼ to 84 inches.

CAST IRON PIPE

THE STANDARD MATERIAL FOR UNDERGROUND MAINS

The Cast Iron Pipe Research Ass'n, Thos. F. Wolfe Research Engr., 1013 Peoples Gas Bldg., Chicago

Discussing the Company Testing Laboratory

● **GEORGE WEHRLE, superintendent of the gas department, Public Service Co. of Colorado, Denver, Colo., in a paper, "Gas Appliance Testing Laboratory," which is a portion of a study of the utility testing laboratory presented before the Annual Convention of the Pacific Coast Gas Association at Seattle, Wash., August 17-19. Mr. Wehrle's treatise is the third and concluding one in a series published by GAS and dealing with this subject. Portions previously published are (August) "Gas Company Appliance Testing Laboratories," by R. I. SNYDER, Southern California Gas Co.; and (September) "The Utility Laboratory Aids the Salesman," by R. V. DAVIS, Southern California Gas Co.—(Abstract by GAS).**

THE primary purpose of our laboratory is to test and pass judgment on all gas appliances which our company contemplates merchandising. It is thus possible to avert excessive customer servicing, and promote customer satisfaction and goodwill. If the appliance fails to pass the laboratory approval requirements, the New Business department has agreed not to sell it.

By this means, only those appliances are sold which are safe, perform satisfactorily under our conditions, and are readily accessible for servicing. Even with the complexity of the newer appliances, the amount of servicing required has been surprisingly low and the customers have been better pleased.

GEORGE WEHRLE

Another function of the laboratory is to develop such equipment as may prove necessary for the betterment of our work. Procedures for proper installation of gas appliances are also established. Meters, regulators, pressure relief valves, attachable draft hoods, etc., are tested periodically.

The laboratory proper has a floor space of 600 sq. ft., although large furnaces, unit heaters, and appliances having high heat inputs are tested in our meter and fitting shops.

Three trained engineers are required in the laboratory. A staff of seven engineers comprises the Utilization Engineering department, which includes the laboratory.

Elevation a Problem

A.G.A. approval requirements are used as a foundation for our requirements, but several points are given more consideration. Because we are situated a mile above sea level, it is necessary to make complete performance tests.

Tentative local approval requirements are formulated by the Engineering Department. These are then submitted for criticism to all interested departments and, after coming to a satisfactory agreement with all concerned, the final requirements are set up as a minimum standard.

Reports are compiled by the engineers making the tests and are approved by the engineer of utilization before being issued. A sketch of the appliance is included as part of the report, also operating difficulties encountered during test and means of overcoming them, recommendations for proper installations, probable points of weakness, performance data, and suggestions as to where trouble may be expected and how to overcome it. Copies are sent to all properties and departments where the information is required, and to the manufacturer or jobber of the equipment.

Testing Procedures

Few of the appliances submitted to our laboratory for test perform satisfactorily under our conditions. It is therefore necessary for us to recommend changes which will permit the appliance to meet our requirements and these recommended changes must be worked out under our conditions and by our own engineers.

We are very careful to check for accessibility of orifices, burners, burner cocks and any other parts which might require frequent adjusting.

Gas Ranges: Pilots are carefully checked with all burners in operation, because frequently operation of the ovens or broilers can cause the top burner pilots to lose their stability.

All burners are tested for production of carbon monoxide, and input ratings are reduced to where our requirements can be met. Top burner efficiency tests are then made at the reduced input rating. Burner operating characteristics are checked under our conditions to be sure they meet the minimum A.G.A. requirements. Gas burner valves are tested for both temperature and their tendency to tighten when a range is operating with all burners on.

Our minimum requirement for floor temperatures is that none shall exceed 60° rise above room temperature.

Other Tests

Other tests made are: leakage, fire hazard, oven heating capacity, oven heat distribution, broiler heat distribution, broiler temperature, surface temperature, thermostat operation and oven heat-up, and draft hood.

Special attention is given to whether the operation of one part of the range interferes in any way with the operation of any other.

Gas Space Heaters: Gas space heaters are given tests similar to those required by A.G.A., except that we are not equipped to make the "closed room" test.

Combustion tests are considered most important, even though our requirements for venting are rigid. If any leaks are detected in either the combustion chamber or radiators, the heater cannot pass our requirements.

In practically all cases, input ratings are reduced even to 70 per cent of rated A.G.A. inputs. It seems that a reduction of 5 per cent per 1,000 ft. of altitude is too severe in some cases but not adequate in others.

Gas Water Heaters: Gas-fired water heaters are given almost all the A.G.A. approval requirement tests.

Ratings are based on carbon monoxide production with the heater hot but with the tank filled with cold water. We have assumed that actual operating conditions are reproduced by having the tank up to 150° F. temperature, then draining off the hot water until the thermostat opens the gas valve, and then continuing to drain the water until the outlet water is cold.

Water heater pilots are given severe stability tests because their failure can very materially increase our servicing costs.

Miscellaneous: Appliances which are frequently tested in our laboratory, but which are not listed in the above groups, include all types of hotel

ranges, broilers and accessories, house-heating boilers, central furnaces, floor furnaces, unit heaters, incinerators, ironers, garage heaters, conversion burners, automatic controls, blowers, fans, etc.

Use of Information

Service and Installation Department: Several copies of each laboratory report are sent to this department. They are bound in loose-leaf books and are located in the shop where all service and installation men have access to them. Most of the men familiarize themselves with the appliances before they are actually installed. The reports are also used extensively in employee job-training work.

Sales Department: Copies of appliance reports are sent to each sales executive. By direct comparison of merits, price, and sales features of appliances, he can better judge which line to handle from the sales standpoint.

Advertising claims are either substantiated or contradicted in the reports. The salesmen are then requested to sell only the features which are justified, so that the serviceman can make the performance of the appliance fulfill the claims. The laboratory sometimes recommends the sale of superior appliances over those being sold.

Employee Education: If the appliance tested has outstanding features or is of such a nature that some education is necessary, the servicemen are called in to inspect the appliance and all points covered in the report are presented. This information is stressed in job-training work.

The Sales department also uses the reports for educating the salesmen on the various talking-point features of the appliance.

Appliance Manufacturers: A copy of our laboratory report is always sent to the manufacturer. If the manufacturer agrees to make the recommended changes, our New Business department usually informs the manufacturer of the probable number that can be sold during the ensuing year. In this way, the manufacturer can determine whether it is economically sound for him to make the changes.

Our laboratory, in most cases, does not specify the exact method for correcting a trouble because the factory engineers are better able to make changes which will fit into their production methods.

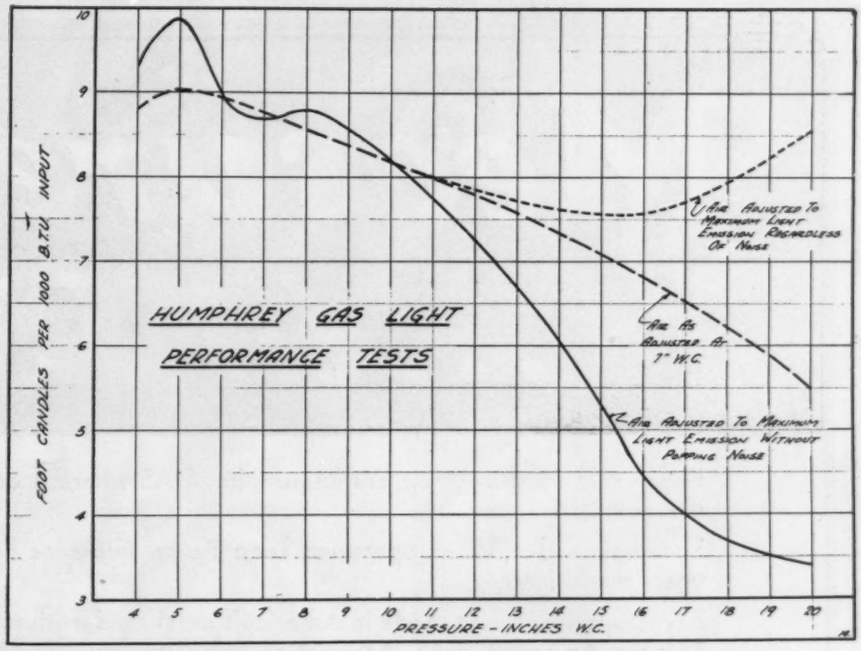

FOOT CANDLES PER 1000 B.T.U. INPUT
HUMPHREY GAS LIGHT
PERFORMANCE TESTS
Air Adjusted To Maximum Light Emission Regardless Of Noise
Air As Adjusted At 7" W.C.
Air Adjusted To Maximum Light Emission Without Popping Noise
PRESSURE - INCHES W.C.

FIG. 1. Humphrey Gas Light Performance.

The Humphrey Opalite Wall Bracket Gas Light

● **R. I. SNYDER, Los Angeles Gas and Electric Corp., Los Angeles, Calif.; in paper to Gas Lighting Sub-Committee, Pacific Coast Gas Association Spring Technical Conference, Los Angeles, Calif., March 18-19, 1937.—(Abstract by G A S).**

THE investigation included tests to determine the operating conditions under which optimum performance could be obtained, effect of variation in pressure or input during normal usage on satisfactory performance, mantle life, flue loss and approximate light efficiency.

R. I. SNYDER

Throughout the tests natural gas of approximately 1,120 B.t.u. per cu. ft. and .65 gravity was burned. Comparative measurement of light emission was accomplished with a Weston illumination meter, with the gas lights mounted and completely enclosed in a light-proof compartment.

The manufacturer's rating of the burner is 5 cu. ft. per hour at 7 inches W. C. pressure. This rating was taken as a normal or base adjustment during the performance tests. Variations in operating conditions were obtained by varying the gas pressure from four to 20 inches W. C. and leaving the gas and air at base adjustment; readjusting the air and gas to give maximum light emission, or readjusting the gas to 5 cu. ft. per hour and the air to maximum light emission and observing the resultant performance from the standpoint of satisfactory operation and light emission. It was found that no appreciable difference existed in the light emitted at any point in the horizontal plane around the portion of the circumference of the light not adjacent to the wall bracket and wall.

At the higher inputs a loud popping noise was present when the air was adjusted to give the lamp maximum light emission.

A series of curves were drawn to show the comparative light emission at various inputs with the air adjusted to give maximum light emission regardless of noise, with the air adjusted at 7 inches W. C. and with the air adjusted to give maximum

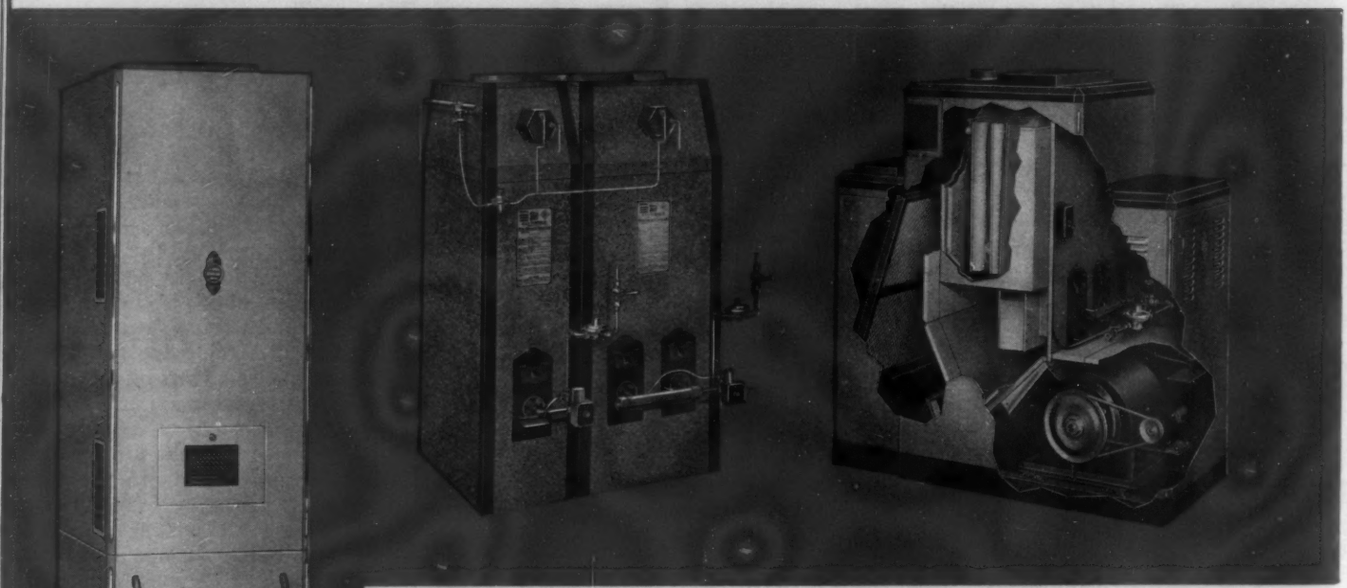
Measure Their ...in CUBIC

Payne owners show their enthusiasm for GAS where it counts—in their more constant use of it!

Economy and efficient operation keep Payne Furnaces lighted longer — encourage a year 'round load.

Payne appliances are made in America's most modern furnace plant. They are designed to pass American GAS Association requirements—and the requirements of the most critical users.

In thousands of homes the comfort and economy of Payneheat are building good-will for GAS—and more business for Gas Companies.



Payne Series "A" (Unit) Furnace. Provides "zone" comfort for individual rooms or suites.

Beverlyair Unit. Payne's latest contribution to year 'round comfort.

Payne FAU (Forced Air Unit). Heats in winter . . . ventilates in summer.

Payne

Good Will FEET!

Payne Console Heater. Styled in harmony with up-to-date lines.

The Payne Duplex Register Furnace. An extremely flexible and efficient unit.

Payne Floor Furnace—the most efficient and economical ever built.

FURNACE & SUPPLY CO., INC.

Beverly Hills, • California.

Table No. 1. Continuous Operation

		Time Elapsed
Test Started.....	6-11-36	
Gradual Failure Noted	10-1-36	2,680.5 hrs.
Final Failure	11-6-36	3,520.5 hrs.
Failure due to accumulation of carbon deposit on mantle.		

Table No. 2. Intermittent Operation

		Time Elapsed
Test Started.....	8-10-36	
Gradual Failure Noted	10-19-36	1,357 hrs.
Final Failure	11-13-36	1,897 hrs.
Final failure due to small break at bottom of mantle.		

light emission with no popping. These indicate that maximum light emission with satisfactory burner characteristics occurs when the light is adjusted to burn from 6,000 to 7,000 B.t.u. per hour or when adjusted to 5 cu. ft. per hour at from eight to 12 inches W. C. pressure. Fig. 1 might be called an efficiency curve as the light emission per 1,000 B.t.u. input is plotted against pressure. Here the highest level portion of the curves occurs between six and 8 inches W. C. pressure. On the basis of all the curves it can be seen that optimum performance is obtained when the light is burning between 6,000 and 7,000 B.t.u. per hour at 8 inches W. C. pressure.

Mantle Tests

Two separate mantle life tests were conducted to determine, (1) the actual continuous burning life, and (2) the life when burned intermittently. In the first test the light was mounted in the light proof compartment and allowed to operate 24 hours a day until the mantle failed through fracture, decrease in light emission or accumulation of carbon deposit. The second test was conducted in the same manner except that the light was turned off each day from 8:30 to 9:00 a.m., from 12:00 to 1:00 p.m. and from 4:00 to 5:00 p.m. This allowed the light to completely cool off before reignition and any difficulty which would be caused by ignition would be encountered. The results of both tests indicated that the life was shortened by deposition of carbon on the mantle caused by a deficiency of air as the screen clogged with dust and lint drawn in through the air shutter. The results of the life tests show in Tables Nos. 1 and 2.

The deposition of carbon on the mantle was first observed by a slight decrease in light emission and did not affect the performance appreciably until the screen became quite clogged, after which a heavy deposit began to appear which ultimately resulted in failure of the mantle. Excessive vibration will affect the mantle considerably. Breaks in the delicate structure are an indication of failure.

The flue gas temperature near the mantle was approximately 1,000 degrees F., resulting in a flue loss of approximately 40 per cent.

By means of a thermopile and potentiometer and suitable filters it was possible to measure that portion of the total radiation from the light that falls in the visible spectrum. This was found to be about 5 per cent. Also, it was determined that approximately 40 per cent of that portion of the heat input not lost out the flue is radiation. This was determined by measuring the relative total radiation with and without the cylindrical glass shade. Therefore it may be deduced that slightly in excess of 1 per cent of the total heat input may be considered as light output.

Pilot Consumption

The pilot consumption of the light is about the same as a typical gas range top burner pilot (0.2 cu. ft. per hour). Because of the extremely large radiating surface of the gas mantle, a soft but penetrating light of good intensity is produced.

Although considerably more research and investigation is necessary in order to bring out the full possibilities of this type of lighting, the immediate market for gas lights of this nature as standby lighting equipment for large department stores, factories and warehouses should not be overlooked.

Missouri River Crossing

(Continued from Page 25)

and lying at right angles to the line. It is located above the high water mark of the stream. The main line connects with one side of the header and the river lines proceed from the other side, cross the stream and connect with a header on the other side.

Each river crossing header is strapped and bolted to a concrete pier set in firm soil.

A minor construction problem faced at the very beginning of the Missouri River crossing is represented in the abrupt slope of the land from the crest to the river's edge at the south bank. In its downward journey the pipe also has to burrow under the Missouri Pacific Railway track that follows the course of the river at this point. Because of this rapidly rising south bank, the header at the south side of the crossing is adequately protected from the river and is situated about 350 ft. from the river bank. However, on the north side bottom lands extend for over a mile from the river bank, and the north header, in order to be above and beyond high water level, is about 5000 ft. north of the river bank.

J. W. Hall of Panhandle Eastern Pipe Line Co. is the company's resident engineer on the Missouri River Crossing and E. P. Streck is the inspector for the War Department.

The Panhandle Eastern main lines cross 11 principal streams in their original course. From west to east they are: Canadian, North Canadian (Beaver), Cimarron, Arkansas, Neosho, Osage, Lamine, Missouri, Mississippi, Illinois and Sangamon Rivers. Of these the Missouri, Mississippi, and Illinois Rivers are navigable, therefore requiring that they be constructed under direct War Department specifications and supervision.

■ ■

Marshalltown, Iowa, May Change to Natural Gas

Natural gas may be served in Marshalltown, Iowa, under the terms of a 25-year franchise granted to Iowa Electric Light & Power Co. at a special election which carried by a vote of 12 to 1. The company now serves manufactured gas. No announcement of its plans has been made.

The company was granted a franchise in Cedar Rapids earlier by a vote of nearly 18 to 1.

■ ■

Cyr Gas Co. Lays 4-in. Line

Cyr Gas Co., Rich Hill, Mo., is replacing its 2-inch line from Prescott, Kan., to Hume, Mo., with a 4-inch line in order to meet increased requirements for gas, especially in the winter. The company is also moving its offices from Rich Hill to Prescott. Wells near Hume and Sprague have been unable to care for the bigger load with the 2-in. line.

Selling Commercial Heat In a Pacific Coast City

● **RAY TROWBRIDGE, Seattle Gas Co., Seattle, Wash., in a paper, "Commercial Heating Sales in a Pacific Coast City," presented before the Sales and Advertising Section at the Annual Convention of the Pacific Coast Gas Association, Seattle, Wash., August 17-19, 1937.—(Abstract by G A S).**

THIS study deals with the sale of unit heaters rather than general commercial heating equipment which covers circulating heaters (including fan circulators), floor furnaces, and central forced air installations.

The city is located in the Pacific Northwest and is of 400,000 population. Its climate simulates few other cities, for heat is required, to some degree, all the year.

RAY TROWBRIDGE

In the commercial field, the overhead fan type, with its self-contained, highly, efficient heating unit, has proved popular. The designation "unit heater" describes the heating unit very well. A cabinet type heater with turbine fan is now available. The heating louvres are located at the top and cold air return louvres at the floor, thus insuring more positive air circulation. One firm is now marketing a factory heating unit which has a propeller type fan at the top of the cabinet and drives the warm air out of louvres located near the floor line.

Stream lining of heating elements is now practiced on some makes and improved fan design has permitted higher fan speeds to be used. Improved design has also entered into the outward appearance of these units, and today they are available in beauty of design, fitting for any office.

The sale of unit heaters in this Pacific Northwest city has increased greatly during the past season due to two reasons; first, an attractive heating rate sponsored by a progressive gas company and, second, the popularity of the heater in use in many establishments where the unit heater fitted ideally into the heating requirements of the establishment.

The gas served by the utility is an artificial mixed gas of approximately 505 B.t.u. per cu. ft. and the gas heating rate is based on 1/10 of a therm, 10,000 B.t.u. or 20 cu. ft. of 500 B.t.u. gas. The rate for this heating service is as follows:

Customer Charge		$1.00
First	3 M c.f. @	75c per M c.f.
Next	5 M c.f. @	55c per M c.f.
Next	10 M c.f. @	40c per M c.f.
Over	18 M c.f. @	30c per M c.f.

Minimum charge of $1.00 per month for nine months, October to June inclusive.

The rate carries a provision that, if Diesel oil (i.e. house-heating oil fuel) varies one cent per gallon, the gas rate varies five cents per M c.f. in the last two rate blocks.

The field for the sale of unit heaters is a large one, for they are not only used in heating buildings but also used in processing work.

A breakdown of the types of business where units are installed shows the following: factories, warehouses, restaurants, grocery stores, markets, drug stores, plant offices, night clubs, beer parlors, Chinese benevolent associations, chain stores, state liquor stores and warehouses, drying artificial flowers, drying macaroni and drying sausage casings.

Many advantages are shown in the sale of unit heaters. Among these may be noted the following: (1) Saving in floor space, (2) high efficiency, (3) economy of operation, (4) low maintenance, (5) completely automatic heating service, (6) effective and positive heat circulation, (7) quiet operation, (8) reasonable operating cost, (9) attractive appearance, (10) fan circulation in summer, (11) simplicity of the installation, and (12) saving in labor costs.

Effective sales aids employed were two. First, with the assistance of one of the manufacturers, an attractive pamphlet was produced, showing a number of installations. These were mailed to a large number of prospective heating customers and were also used effectively in our sales contacts. Second, a compilation of customers' bills was made and used in prospect contacts. Occasionally a job was guaranteed to meet the heating requirements and estimated operating costs, or the money paid in on the equipment was refunded at the customer's request at the end of the heating season. The customer agreed to pay for the gas used.

While many heaters were sold for cash, the usual term was for 12 months; one-half of one per cent per month was the carying charge.

The sizing of jobs has been done largely by estimating the heat loss from the building, using the following formula:

$$\text{Heat Loss} = (G + \tfrac{1}{4}\overline{W} + .02\,NC)\,TD$$

where

G = Glass

$\overline{W}$ = Net wall plus ceiling area (but not the floor).

NC = Number of air changes (one usually).

TD = Temperature difference.

For office heating or buildings where 70°F is required we use 50 for TD or a rise from 20 to 70°F.

Two methods are used in determining the heating season's costs:

First, (the Degree Day Method):

$$\frac{\text{Hr. Heat Loss}}{\text{Temp. Rise}} \times \frac{\text{Operating Hrs.} \times \text{Deg. Days, for Temp. Carried}}{500 \times 80\text{ per cent Efficiency}}$$

Second:

4 months at ½ maximum hourly heater capacity in cu. ft. plus 4 months at ⅔ hourly maximum of the heater capacity in cu. ft.

The total in either case applied to the gas rate gives the season's heating costs. It is remarkable how near the second rough and ready estimate hits the nail on the head for use in the average installation. In the larger installations where several units are used, more care in calculating costs is required.

Competition is principally Diesel oil. The company's low rate compares favorably with 6¼c Diesel. Our job being so much simpler than oil and in many cases less costly to install, we have found a ready acceptance to our heating proposals.

The principal thing is to get the business and the way to do it is to:

1. Prospect all potential classes.

2. Take on any trial or guaranteed jobs where necessary and estimates are positive. Ninety per cent will stick.

3. Follow up all jobs consistently. Keep a daily file, corresponding with the meter read date, with a record card of consumption.

4. At the end of the season, compare the operating costs with the estimate and secure from the customer a favorable testimonial.

5. Carry a tabulation of costs covering many installations to show to prospects. Compare estimate of prospect's cost with similar installations.

Stone, Spokane Utility Head, Promoted to Danbury

JAMES L. STONE, president and general manager of the Spokane Gas & Fuel Co., Spokane, Wash., for 14 years its head, has been promoted to vice-president and general manager of the Danbury & Bethel Electric & Gas Co., another of the H. L. Doherty-operated companies controlled by Cities Service Co.

JAS. L. STONE

The Danbury Co., among the oldest of the New England utilities, supplies electric light and power to Danbury, Bethel, Brookfield and Sandy Hook, all in the heart of the manufacturing districts of Connecticut. Gas also is furnished industries in Danbury and Bethel.

Frank A. Woodworth of Cities Service's New York office will succeed Mr. Stone as general manager. He formerly was general manager of the Fremont Gas Co. at Fremont, Neb., and was connected with Cities Service in Denver when Mr. Stone joined the organization there 32 years ago.

Mr. Stone came to Spokane in 1923 from Alliance, Ohio, where he was vice-president and general manager of the Ohio Public Service Co., also a Doherty-operated concern.

Mr. Stone was president of the Pacific Coast Gas Association in 1932.

■ ■

El Paso Natural Launches 32-Mile Pipe-Line Project

A compressor station improvement program costing $1,400,000 (*G A S*, May, 1937) was being completed in September by El Paso (Texas) Natural Gas Co. in West Texas, New Mexico, and Arizona, according to C. C. Cragin, vice-president and general manager. A pipe-line construction program costing $500,000 was to be launched immediately, Mr. Cragin stated in a further announcement to the press.

The new program includes the laying of 32 miles of 16-in. pipe between El Paso and Jal, N. M., and three miles of 12¾-in. pipe between El Paso and Deming. The new lines will increase the gas capacity from 75,000,000 to 80,000,000 cu. ft. a day.

The compressing stations included in the finished program are near Gage, N. M., 10 miles east of Douglas, Ariz., 33 miles south of Tucson, Ariz., 60 miles east of El Paso, 130 miles east of El Paso, and near El Paso.

■ ■

Rio Grande Valley Co. Builds 9½-Mile Line to Donna

Rio Grande Valley Gas Co., Brownsville, Texas, has completed 9½ miles of 6-inch pipe line from the La Blanca field to a point on its main line near Donna, Texas. The new line carries casinghead gas from the McDougall and Pentano wells. Gas from these wells was purchased on a 10-year contract, according to a company announcement. The contract also includes all gas from wells to be drilled in the future on the 1100-acre tract in which the wells now producing are located.

Main supply of the Rio Grande Valley Gas Co., which supplies 17 communities, comes from Jim Hogg county. The company has a line from the Mestenas and La Blanca fields to a joint connection at Mercedes.

■ ■

Dallas Gas Co.'s Carrier and Skid Cut Range Moving Cost

A stove carrier and skid board that permit two men to deliver gas ranges and to carry as many as five ranges on a single trip have been designed and constructed by William F. Pearson and Harry A. Deuser, Dallas Gas Co., Dallas, Texas.

The stove carrier is built of one-inch gas pipe and is equipped with handles which operate on a pin connection so that they may be dropped when the range is placed on the truck. The carrier is 81 inches long and 24 inches wide. The handles are 15 inches long. Built in a W-shape to allow the range to fit down into the carrier and to protect the enamel sides and legs, the center section of the device is padded with one-half inch sponge rubber as a cushion for the range to rest on. Three-inch rubber casters on the carrier hold the range approximately 18 inches off the ground when mounted.

One carrier is used for each range.

The skid board, 8 ft. 9 in. long and 2 ft. 1 in. wide, is equipped with a pair of hooks on one end which fasten to the truck bed when the range is to be loaded. The board consists of two runners with steel reinforcements between them and with wooden cleats placed crosswise to prevent the men from slipping as they load the range. Runners are made in groove form on the skid board, and once the casters of the stove carrier are started in the groove they will not slip out. When not in use, the board is carried underneath the truck bed on the chassis.

■ ■

Large Montana Gas Well

With a gas flow of 30,730,000 cu. ft. daily, the second largest well in the Cut Bank Field, Glacier County, Mont., was brought in recently by Glacier Production Co. It is the largest gas well in the field producing from the Cut Bank sand.

Calendar

October

Chicago Exposition of Power and Mechanical Engineering—New International Amphitheater, Chicago, Ill., October 4-9.

American Society for Metals—1937 Metal Congress and Exposition, Atlantic City Auditorium, Atlantic City, N. J., October 18-21.

Mid-Continent Oil & Gas Association of Texas—Dallas, Texas, October 29-30.

November

American Petroleum Institute—Stevens Hotel, Chicago, Ill., Nov. 9-12.

Seventeenth Annual Gas School Conference—Iowa State College, Ames, Iowa, Nov. 10-13.

National Bureau of Standards—Conference on Corrosion and Protection of Pipe Lines, National Bureau of Standards, Washington, D. C., Nov. 15-17.

February, 1938

New England Gas Association—Hotel Statler, Boston, Mass., Feb. 24-25.

Natural Gas Revenues Gain 7.2% First Half of 1937

DOMESTIC customers of manufactured and natural gas utilities totalled 15,787,500 on June 30, an increase of 223,000 during the first six months of 1937, according to announcement by Paul Ryan, chief statistician of the American Gas Association.

This gain in customers is reflected in the fact that a total of 823,000 gas ranges were sold in the country during the first half of 1937. This was an increase of some 22 per cent over the first six months of 1936. Approximately 80 per cent of such sales consisted of relatively high priced ranges incorporating modern automatic features, such as oven-heat control. (Elsewhere in this issue figures are announced covering gas range production in 1936.)

Revenues of the natural gas industry for the first six months amounted to $247,603,300, a gain of 7.2 per cent over a year ago. Revenues from industrial uses increased 18 per cent, while revenues from domestic uses gained 3.1 per cent, according to the figures compiled by the American Gas Association.

Manufactured gas industry revenues totalled $186,246,400 for the first six months, practically unchanged from a year ago. Revenues from industrial and commercial uses of manufactured gas gained 6 per cent. Revenues from domestic uses, such as cooking, water-heating, refrigeration, etc., were 2 per cent less than for the corresponding period of 1936.

■ ■

Ohio Fuel Gas Co.'s $400,000 Program Awaits Sale O. K.

Approximately $400,000 will be spent by The Ohio Fuel Gas Co. on line changes and extensions, installation of mixing equipment and controls, and in service and meter readjustments, if the company is granted permission to buy the distribution system of the Northwestern Ohio Natural Gas Co., according to E. M. Tharp, vice-president and general manager of both companies. Application for the sale is now pending before the Public Utilities Commission of Ohio.

If the petition is granted, Vice-President Tharp states, the Ohio Fuel Gas Co. will serve domestic and commercial consumers with mixed gas having a minimum B.t.u. value of 850.

Northwestern Ohio Natural Gas Co. serves 65,000 consumers in Toledo, Maumee, Perrysburg, and Rossford. The Ohio Fuel Gas Co. serves 316,000 consumers in approximately 300 communities, including Toledo. Both companies are subsidiaries of Columbia Gas & Electric Corp.

■ ■

Central Arizona Starts Work On $800,000 Expansion

Central Arizona Light and Power Co., Phoenix, Ariz., is spending $25,000 to build gas mains to serve the Brophy College district, according to announcement by John F. Quinn, Phoenix district manager.

Expanding territory will necessitate further extensions during the year, it is said, which are expected to cost approximately $800,000.

A MESSAGE

TO THE

GAS INDUSTRY

from

JOHN A. FRY

President

★

★ ★ ★ **DETROIT-MICHIGAN STOVE CO.**

BECAUSE again you have made it possible for the Detroit-Michigan Stove Co. to write into its history another chapter of successful achievements, I desire, on behalf of both myself and the company, to once more repeat my sincere words of other years and say, "I thank you."

We believe that factories, like people, can have individuality. We believe that excellence in a product can be achieved only by integrity in the spirit behind its creation.

For seventy-one years, this company has been guided by a heritage of successive, progressive accomplishments! Each era of administration has inherited, absorbed, and sincerely striven to uphold the spirit of leadership exemplified by its predecessors.

That is why, today, we are so proud of the products of the Detroit-Michigan Stove Co. We have kept faith with the progress of the industry! We believe we have been a part of it! By unswerving allegiance to quality, and with efficiency as our eternal

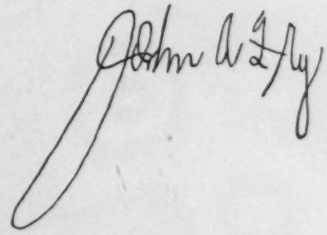
objective, we have striven to provide, for fuel gas, the most complimentary appliances in the world.

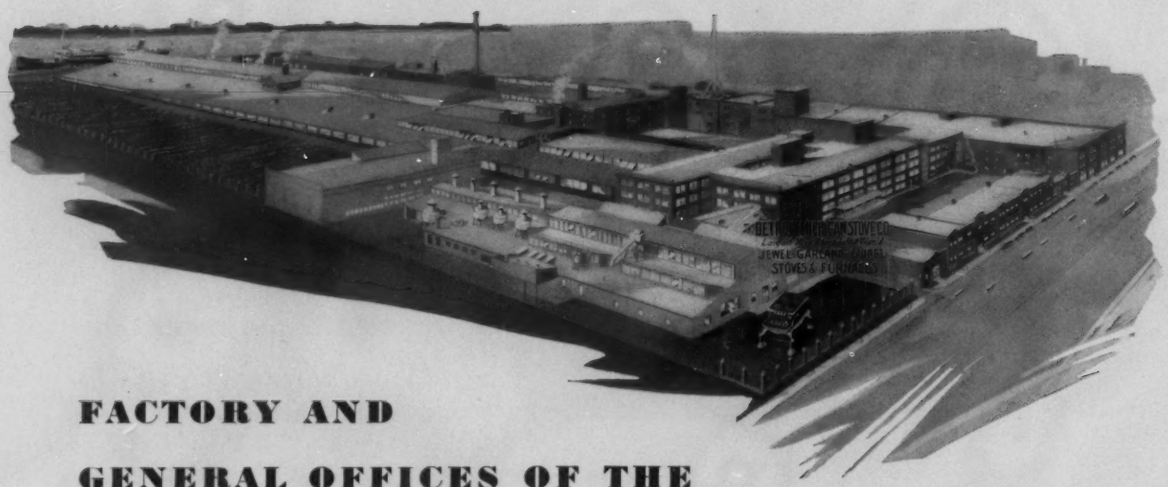
That we shall continue to do so I can best express in the words of this, the creed of our company:

"To build a product so attractive in appearance as to delight the owner's eye, so durable as to provide years of lasting service, and so fairly priced as to meet the most exacting buyer's standard of value.

"To so pursue our dealings with our trade as to insure a long and profitable association; to co-operate in mutual understandings for the benefit of all; and to so conduct ourselves as to erect a monument of friendly feeling as lasting as eternity.

"This, for a period of seventy-one years, has been the purpose to which we have dedicated all our thoughts, our resources, and our skill."





FACTORY AND
GENERAL OFFICES OF THE

DETROIT-MICHIGAN STOVE CO.

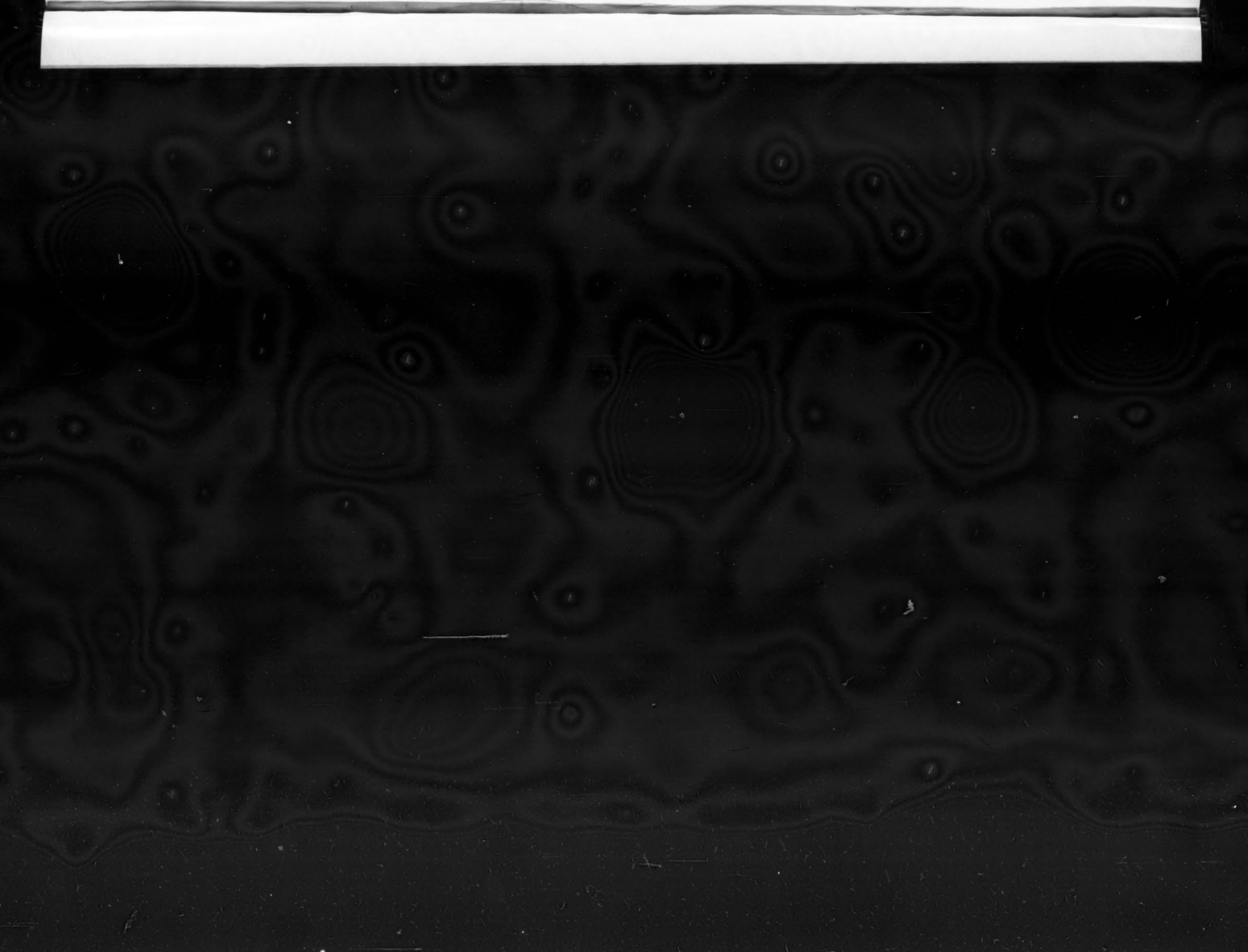
DETROIT, MICHIGAN

★

HOME OF

DETROIT JEWEL GAS RANGES

GARLAND GAS RANGES AND
COMMERCIAL COOKING APPLIANCES



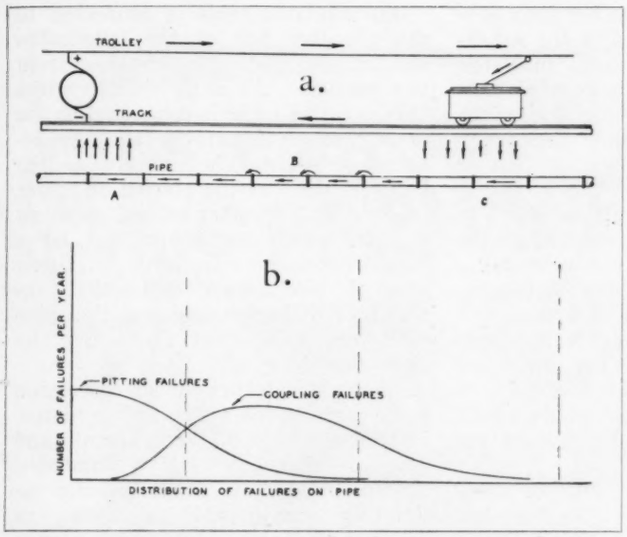


FIG 1. Pipe failures due to railway stray currents (pipe not drained).

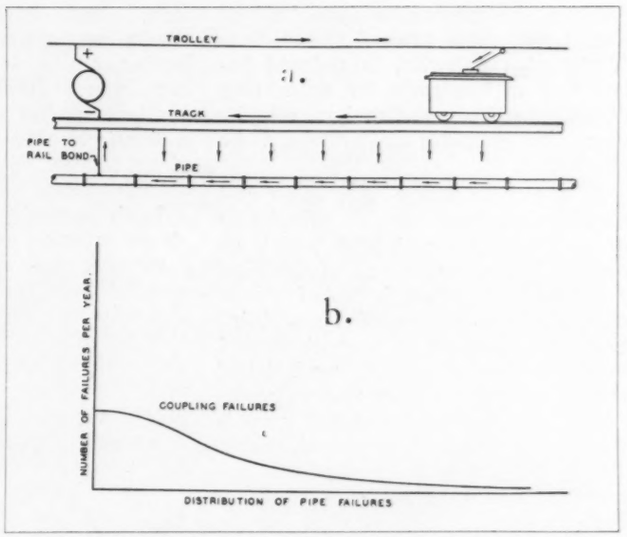


FIG. 2. Pipe failures due to railway stray currents (pipe drained at station).

High Resistant Couplings to Control Electrolysis on Underground Pipe

● **W. R. SCHNEIDER, Pacific Gas and Electric Co., San Francisco, Calif.; in paper entitled "Introduction and Elimination of High Resistance Pipe Couplings for the Mitigation of Electrolysis" to Pipe Protection Sub-Committee, Pacific Coast Gas Association Spring Technical Conference, Los Angeles, Calif., March 18-19,1937.—(Abstract by G A S).**

THE purpose of all changes made in the conductivity of a pipe line, by the introduction or elimination of high resistance couplings, is to reduce or eliminate the discharge of an electric current from some portion of the pipe surface.

Some of the methods used to accomplish this are:

1. One or more insulating couplings are installed in a pipe line to prevent the flow of an electric current.

2. High resistance connections of a pipe line are bonded in order to produce a low resistance path for the pipe current to follow to a metallic drainage connection.

3. A combination of the above two methods.

4. One or more insulating joints are placed in a line and each shunted by a suitable resistance, thus increasing the resistance and grading of the pipe line by a predetermined amount. Resistances around insulating couplings are used to drain a limited current from the positive to the negative side if tests show that the coupling is discharging a current into the soil on the positive side.

Which system or combination of systems is to be adopted in a particular locality is a question of economics, and requires tests and a careful study of the electrical features of all interconnected and superimposed systems of pipes, networks and other underground structures.

The growth of the various superimposed pipe systems and the possibility of extension or abandonment of electric car lines must be taken into consideration. The effect of changes of electric railway substations, their load distribution, and the shifting load distribution of automatic substations must be carefully studied.

A pipe system that has been carefully laid out with bonds and insulating joints for the present conditions, may require numerous and expensive changes later, if the various factors connected with the growth of a community have not been anticipated.

Consider a pipe line paralleled by an electric railway as shown in Fig. 1 (a). Stray current from the rails at the distance end of the line will enter the pipe at "C," flow along the pipe through the zone "B," and reenter the rails at "A," in the vicinity of the power station. At "C" the rails are highly positive to the pipes. If the current directly on the surface of the pipes at "C" is sufficiently high, all corrosion will be prevented and all current ordinarily shunting around a high resistance coupling will be suppressed. In zone "C," therefore, there will be but little pitting and few coupling failures.

In zone "B," where the rail to pipe potential is low and practically zero, the potential gradient due to the stray current flowing from the rails to the pipe will not be sufficiently high to prevent current shunting around the high resistance joints, so that coupling failures will be high.

In zone "A" the rail will be negative to the pipe and most of the failures will be due to pitting of the pipe surface. The distribution of the two characteristic types of pipe failures are shown in (b) of Fig. 1.

If the substation is in the center of the community, the zones "A," "B," and "C" will be concentric circles and all parts of the pipe networks within these zones will be subject to the type of corrosion described.

In Fig. 2 (a) is shown the soil current distribution due to bonding of the pipe to the rail or negative terminal of the DC generator at the power station. All the current is returned through this return bond so that pitting of the pipe in the zone "A" is

reduced and pitting in zone "B" of Fig. 1 will move toward the station. If the pipe potential is reduced below that of the rails, by connecting directly to the negative bus, all pitting and coupling failures can be eliminated.

In a city in which the mains and distribution lines consist principally of cast iron pipe with lead, leadite or cement joints, bonding all of the high resistance couplings is not feasible, since the expense would be prohibitive. The amount of current carried by these lines is usually small but if the overall drop of potention or gradient is high, joint failures and graphitization of the cast iron will result. The distribution of failures will approximately be the same as shown in Fig. 1 (b).

Attempting to drain a cast iron line with lead joints, at the substation, is seldom satisfactory. The potential of the line is reduced for a short distance only and will increase the coupling failures. (This statement does not apply to the new type of cast iron lines having brazed connections. The electrical characteristics of this type of cast iron line are similar to those of a welded steel line.)

A cast iron line carrying sufficient current to cause trouble at the bell joints and to jeopardize the adjacent distribution mains can be controlled by the insertion of one or more insulating joints if other considerations permit, and also by insulating the laterals and services connected to it.

Handling a City Network

A large city network can be effectively dealt with, in cooperation with other pipe owning utilities and electric railways, by dividing them into a number of smaller networks, each electrically separated from the others. These smaller units are selected to cover areas having a comparatively uniform type of corrosion and pipe failures, such as the three zones described. If the city is traversed by electric street railways, with track returns, the pipes may be subjected to a high overall potential. The smaller networks should be chosen with due consideration being given to these overall potentials. Each of the smaller units should have as low an overall potential across it as possible.

The corrosion in each small network can be controlled by means of bonded or insulating couplings, graded high resistance couplings, increased wrapping or other pipe insulation, relocation of pipes, and electric protection. Each of the smaller unit networks can be connected to the neighboring units with solid insulated couplings or resistance coupled connections, and if necessary drained to a common through-main to convey stray current to a railway station or other drainage point.

High overall potentials due to street railways can be reduced by rearranging and installing new negative returns from different points on the rails to the negative bus of the railway station. The overall potentials can be reduced to a low value and the stray currents reduced to practically zero by the installation of a system of insulated negative returns.

The principle of the use of insulated negative return cables for electric street railways is as follows:

An insulated cable is connected to the negative bus at the substation and to the rails at a distance from the station. At intervening points this negative cable is connected to the rails through resistance of a predetermined value. The rails, instead of being drained at the station only, are drained at a number of points along the line, with the result that large overall potentials are prevented. Stray current electrolysis difficulties, instead of being fought on the pipe lines, are stopped at the source, as they should be.

Eliminating stray current corrosion reduces corrosion difficulties in metropolitan areas to that of galvanic and soil corrosion which can be combated by subdivision of the networks insulating couplings, bonds, etc., as mentioned above.

Chicago Utility Improves Customer Personal Call Service by 50%

BY consolidating the personal call work of the credit and collection, customers' order, and general service departments, The Peoples Gas Light and Coke Co., Chicago, Ill., has cut the time required to complete the average customer's request from twelve minutes to less than six minutes and has eliminated about 75,000 customer trips between departments each year. The new department is called the customers' department and is in charge of C. L. Sullivan, superintendent. Mr. Sullivan was formerly assistant superintendent of the meter reading department.

The customers' department is centered on the main floor, in a space enclosed by a low marble counter. Noise-absorbing cork covers the floor. Thirty-nine desks for interviewers have been placed in this enclosure. The desks are of welded steel and mahogany, with linoleum tops to match the finish. They have an open side so that the customer may sit comfortably. The top drawer of the desk holds a stationery rack accommodating the 31 forms used by the interviewers. The bottom drawer hides a wastebasket. An ashtray for customers is also hidden when not in use.

The telephone plays an important part in the efficiency of the new department, and each of the 39 desks is equipped with the latest type, which has a bell in the base so adjusted in tone that calls are not confused. Interviewers use the phones instead of the tube system to obtain information from various departments. This system enables the customer to remain seated during the entire transaction, and saves time for both customer and company.

On each desk is also a combination calendar rack and desk pen with an adjustable point to suit the individual.

Though the department is equipped for an interviewing staff of 39, that number of interviewers is seldom needed. Under the system worked out, the skeleton staff is augmented by employees trained in the work of the department who are called, as needed, from their regular work in other departments. Customers are not kept waiting, even during peak periods, longer than two or three minutes, a company spokesman states. There is a waiting lounge, furnished in keeping with the rest of the department.

This flexible system underwent a severe test on July 19, when the department served 1,094 customers—and took care of 330 in the two-hour period from 11:30 a.m. to 1:30 p.m.

Ushers greet customers as they enter the department, ask what service they wish, and conduct each to an interviewer. The interviewers are trained to meet speedily any request for service—from turning on the gas or supplying a duplicate bill to giving the status of an account or making an appliance adjustment.

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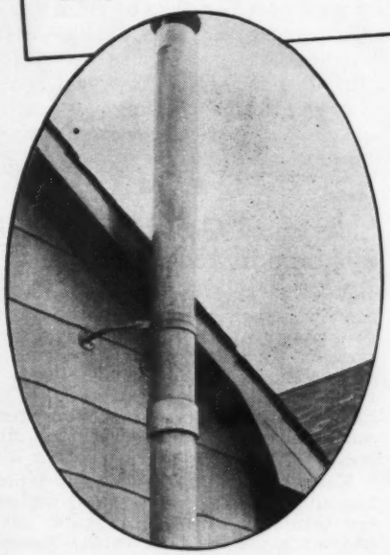

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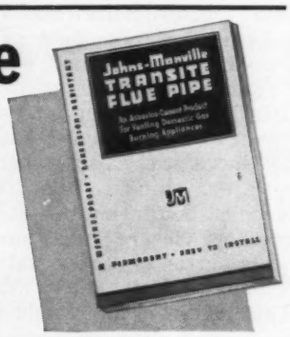

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Gas Engine Operation and Maintenance

● **LEAL DAVIS, Pacific Gas and Electric Co., San Francisco, Calif.; in a paper, "Operation and Maintenance of Gas Engines," presented before the Technical Section at the Annual Convention of the Pacific Coast Gas Association at Seattle, Wash., August 17-19, 1937.—(Abstract by G A S).**

ONE of the most essential factors governing the successful operation of large size gas engines is the maintenance of piston rings and cylinders.

With continued use the piston rings naturally wear and become thinner, and the cylinder walls or barrels also wear and become larger.

We can control this wear to a certain extent in three ways:

1. By the use of piston rings made of material that is more or less resistant to wear.

2. By supplying adequate lubrication, and the use of lubricants of proper quality.

3. By keeping cylinder temperatures at the correct point.

In order to determine the amount of cylinder wear under different conditions, it is a good plan to take micrometer measurements, both vertical and horizontal, of each power cylinder once each year when the engine is dismantled for the seasonal overhaul, and keep records of them.

At the Kettleman Hills plant of the Pacific Gas and Electric Co. such records are kept and have proved very useful. We have found also that there is a great difference in the service and wear from the different makes of piston rings.

Two comparative tests have been made to determine the relative value of piston rings supplied by two different manufacturers and to observe the amount of cylinder wear with each.

The summer of 1934 one engine was fitted on the R.H. side with rings of one manufacture, which we can designate as "A." The L.H. side of the same engine was fitted with rings of another manufacture, which we will designate as "B." Before installing these rings the cylinders were carefully measured, and after they had operated a year were again measured. The results as shown below are quite interesting.

Average wear on the two Cylinders with "A" Rings.. .0094 in.
Average wear on the two Cylinders with "B" Rings... .00583 in.
Loss in weight in the two Sets "A" Rings.....15 lbs. 15 oz.
Loss in weight in the two Sets "B" Rings..... 5 lbs. 0 oz.

The same test was made again from 1935 to 1936 on No. 3 Engine as follows:

Average wear on two Cylinders with "A" Rings. .01533 in.
Average wear on two Cylinders with "B" Rings.. .01308 in.
Loss in weight of two sets of "A" Rings....20 lbs. 15 oz.
Loss in weight of two sets of "B" Rings.... 6 lbs. 12 oz.

These tests made after a period of two years show that the material of which the rings are made have quite a bearing on not only the life of the ring themselves but also on cylinder wear.

The lubrication supplied both R.H. and L.H. sides of both engines was the same, and load, and temperature conditions were the same.

Proper Oil Essential

The selection of the proper oil for the lubrication of large gas engine cylinders is most essential. This oil should be chosen for its ability to meet the requirements rather than on a price basis. Oil for this service should have a flash point of not less than 425°F., should have sufficient viscosity to maintain a film on cylinder walls, and still be thin enough to spread to give an even distribution so as to cover the entire surface subjected to wear. An oil may meet the requirements of flash point, viscosity, etc. and still contain such quantities of carbon forming elements that its continued use will cause trouble. Sometimes an oil can be used where the load and temperatures are not very great with very good results, but when greater load demands and consequent higher temperatures are encountered trouble will be experienced at the point where the oil enters the cylinder. Oils that carry too much carbon forming matter will, under more severe conditions, choke up the nozzle or check valve through which the oil enters the cylinder. This makes it impossible to continue to supply the cylinder with an adequate amount of oil and frequently necessitates shutting down the unit to permit the cleaning of this carbon from the oil passages.

The control of cylinder temperatures has a pronounced effect on the wear of barrels and the life of piston rings. Too high an operating temperature will allow the pistons to become hot enough to cause pre-ignition or "pinging" on heavy loads and a consequent loss of power. It also makes lubrication more difficult, as it is much harder to maintain the proper oil film on extremely hot surfaces. The formation of scale deposits in the water passages are more difficult to prevent if high operating temperatures prevail, and if scale is allowed to accumulate, adequate cooling is impossible.

Too low an operating temperature is almost as bad as too high, as with low cylinder temperatures there is a condensation of the products of combustion. This "sweating" of cylinder walls tends to wash off the oil film, which permits undue wear. The condensation of water from the products of combustion forms carbonic acid, which in itself is very corrosive and which also breaks down the oil film and causes excessive wear. We have found that a jacket water outlet temperature of 120° and a piston rod outlet water temperature of from 130° to 140° is most desirable. This maintains a cylinder wall temperature of from 170° to 180°, which is warm enough to prevent condensation or "sweating" and cool enough to secure maximum power.

■ ■

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Half of Counties in U. S. Without Gas Service

More than 1,500 of the 3,074 counties in the United States are without commercial gas service, according to a marketing study conducted by the Bureau of Foreign and Domestic Commerce of the U. S. Department of Commerce. Only 20 counties are without commercial electric service, the survey disclosed.

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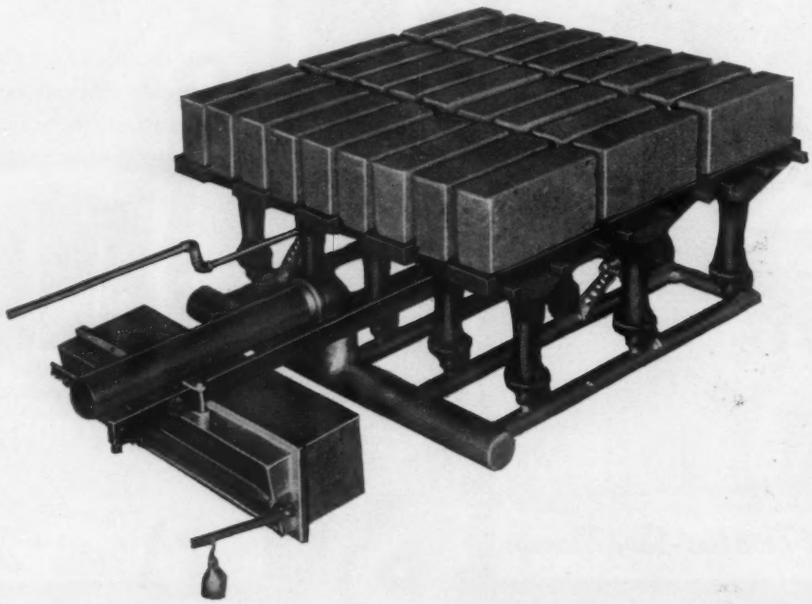

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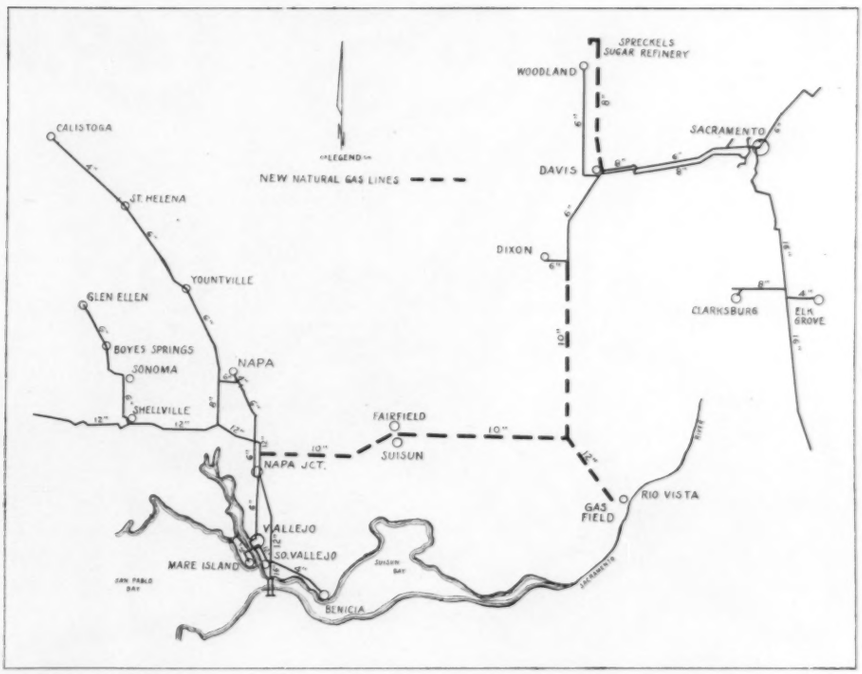
ONE OF CALIFORNIA'S gas discoveries and pipe line developments came to a head during September when the Pacific Gas and Electric Company, San Francisco, completed almost all construction in connection with the bringing of natural gas from the recently discovered Rio Vista field to domestic customers in Dixon. The Rio Vista field is located two miles from Rio Vista in the Montezuma Hills west of the Sacramento River. The project cost $900,000.00 and involved the construction of some 60 miles of pipe line. —Editor.



Pipe line map of Pacific Gas and Electric Company's Rio Vista Gas field development.

P. G. and E. Completes Rio Vista Field Project

By FRED F. DOYLE

Manager, Natural Gas Division
Pacific Gas and Electric Company

F. F. DOYLE

CONSTRUCTION of the Rio Vista gas field project in California was started on June 16, 1937, under the direction of the Pacific Gas and Electric Co.'s General Construction department, and gas from the Amerada Petroleum Corp.'s wells was first turned into the system for purging out the air and cleaning the line on September 7, 1937; on the following day, September 8, Rio Vista gas was first delivered to the customers in the town of Dixon. On September 13, Rio Vista gas supplemented Kettleman Hills gas at the Spreckels' Sugar Refinery, located north of Woodland. A small amount of construction work remains to be done on the line leading to Napa Junction and it is expected that that part of the new system will be in service before the end of September.

The connection of this new source of supply, the Rio Vista Field, will not only add to the supply of gas available to meet the growing demands of the Pacific Gas and Electric Co., especially the customers in Solano, Yolo, Marin, Sonoma, and Napa Counties, but it will also serve as a safety factor to give greater assurance of a supply for the northern end of the system, possibly preventing a shortage or low pressure in case of extreme peak loads or interruptions to transmission of gas from the southern fields due to breaks in the lines which might occur.

The Rio Vista gas field was discovered by the Amerada Petroleum Corp. of California in 1936 when it brought in its Emigh No. 1 Well in June of that year. The field is located about one mile north and west of the town of Rio Vista in Solano County, Calif., and approximately 32 miles south and west of Sacramento.

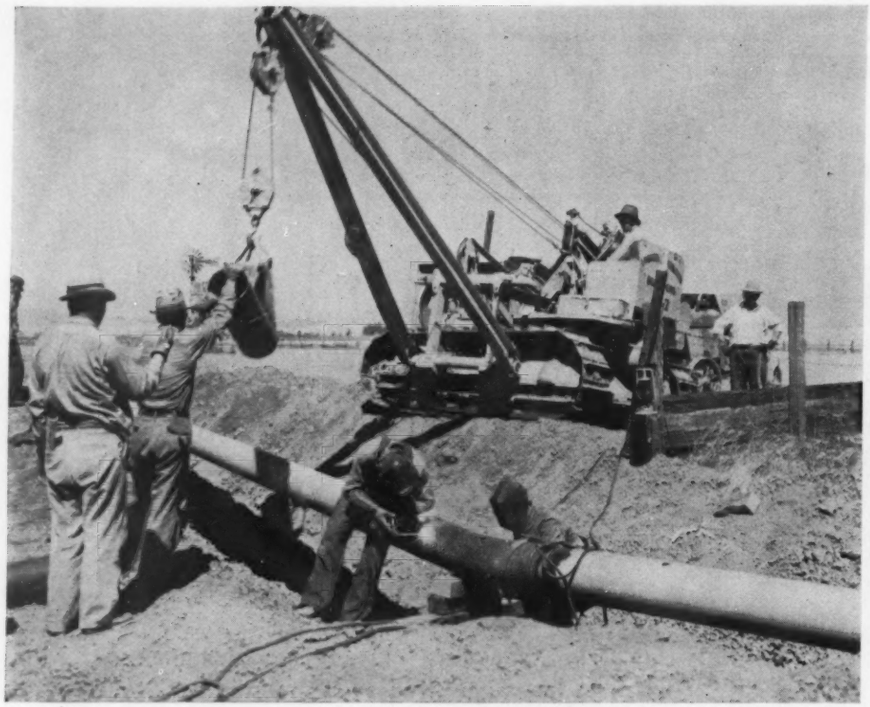
The territory in which the field is located consists of rolling hills, is farmed mostly for the production of wheat, and is very fertile. The decision to drill in that locality was made by the oil company after considerable time was spent making geophysical surveys, which indicated the existence of a structure in that area.

The discovery well was located in Section 26, Township 4 North, Range 2 East, and on production tests it produced at the rate of a little over 80 million cu. ft. per day. It was drilled to a total depth of 4,485 feet with 11¾ in. casing cemented at 4,278 ft. Following the completion of this well, the Standard Oil Co. brought in its Perry Anderson No. 1 Well, located approximately one and one-quarter miles south of the Emigh No. 1 Well and a little east of it.

The Amerada Petroleum Corp. has continued drilling operations since the discovery well was brought in and has completed 12 producers to date, and drilled one dry hole. The nonproducer was drilled on the northwest part of the present producing area and was carried to a depth slightly in excess of 7000 ft. Also to the west of the field, the Standard Oil Co. drilled a well in which no production was obtained. The distance between the two producing wells at the extreme ends of the field is two and one-half miles and the limits are not known exactly as yet. The width of the present known productive area is approximately two miles.

Relative to the geology of the structure, the following is the approximate character of formation encountered:

From the surface down to a depth of about 500 ft. is Aluvium. From 500 ft. to 2000 ft. the San Pablo formation was encountered, which is of the Pliocene Age. From that depth down to 3800 ft. they went through the Markley formation, which is of the Miocene Age. From 3800 ft to



Electric welding a factory bend at an angle in the Rio Vista transmission line.

4200 ft. a shale was drilled through, which was designated as the Emigh Shale, being equivalent to the Kreyenhagen Shales found in the central part of the State, also of Miocene origin. From approximately 4200 ft. down to the bottom of the wells, the sands encountered were of the Eocene formation, from which the natural gas production is obtained.

Gas of Good Quality

The dry gas obtained from these wells is of good quality with a high heat value. No gas has been wasted in the field at all and only enough has been taken out to furnish fuel for drilling. The shut-in pressure of the field is 1725 lbs. and, when produced at a rate of 15 million cu. ft. per day through the casing, the pressure at the top of one of the wells pulled down only 20 lbs. The producing horizon averages about 200 ft. in thickness and has a high porosity.

The foregoing data relative to the formations encountered is approximate and the actual depths vary somewhat in the different wells.

After a number of wells were completed the area of the field and the character of the wells indicated a good potential supply of gas; therefore, the Pacific Gas and Electric Co., which furnishes natural gas to the northern part of California, contracted to take gas from the field to augment its supply from other fields in the State, especially the gas purchased in the Kettleman Hills area. Accordingly, plans were made to install gathering lines in the field and to lay transmission lines from that area to tie-in to its existing system.

The new lines constructed total about 60 miles in length and the additional expenditure was over $900,000.00. The gathering lines in the field are 6 and 8 in. in diameter, being connected to a 12 in. line which extends approximately 7¼ miles in the northwesterly direction from the field. At that point, a 10 in. line runs west to what is known as the Napa "Y" Junction on the State Highway, traverses a distance of 26 miles, and connects to the existing 12 in. line which is the main feeder line for the company's North Bay division, which line extends from a point south of Vallejo, north to Napa Junction, and west to Petaluma.

From the end of the 12 in. carrier, a 10 in. line was laid due north tying it to the company's present 6 in. line about two miles east of the town of Dixon in the Sacramento division. Also, a new section of 8 in. line 12 miles long was laid north from the town of Davis to the Spreckles' Sugar Refinery located north of Woodland.

Orifice meters with suitable traps and fittings were installed at each well to measure the gas received, and the same type meters were installed at the ends of the transmission lines to measure gas delivered from that field into the existing lines. The pipe was laid on skids directly over the ditch and electrically welded in place without rolling, which required an overhead weld at each joint. It was found that better time could be made with that method rather than welding the line in long sections alongside the ditch by making rolling welds and tying these long sections together. This was the main feature of the construction of the lines, the balance of the work being according to regular practice. At all turns in the line, factory bends were used in every instance possible, rather than making angle welds; all pipe used was seamless steel, with double bell ends. The system was designed with a factor of safety of four. The 8 and 10 in. pipe was factory tested to 800 lbs., the 12 in. to 700 lbs., and the 6 in. to 950 lbs. per sq. in. All fittings installed were for high pressure, it being planned to carry up to 600 lbs. on the lines when necessary.

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Rita Calhoun Home Service Head of Portland Utility

Rita Calhoun, well-known home economist of Portland, Ore., has been appointed head of the Portland Gas & Coke Co.'s home service department, according to an announcement by John J. Winn, Jr., commercial manager.

Mrs. Calhoun was at one time home service director of Orange County, Calif., for the Southern Counties Gas Co., and has held a similar position with the natural gas division of the Montana Power Co. of Butte.

She is an Oregon State college graduate in home economics and in recent years has been in charge of the *Oregon Daily Journal* home service department in Portland.

In her new position she will be assisted by Dorothy Schwarz and Mary L. Walsh of the gas company's home service department, and Janet Riggs, who has been newly appointed.

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Kansas Towns May Get Gas

Gas may be piped to Courtland and Republic, Kan., by Kansas Power & Light Co., according to Arthur Groesbeck, district manager. A 16-mile line from Scandia to these communities will be included in the 1938 budget, Mr. Groesbeck stated, but must thereafter be passed upon by the finance committee.

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Utilize Gas on Reservation

Gas coming from a hot water well at Red Scaffold, Cheyenne River Reservation, South Dakota, will be used for heating and cooking, according to the office of Indian Affairs. Tanks, burners, and other equipment will be installed, effecting an estimated annual fuel saving of $780.

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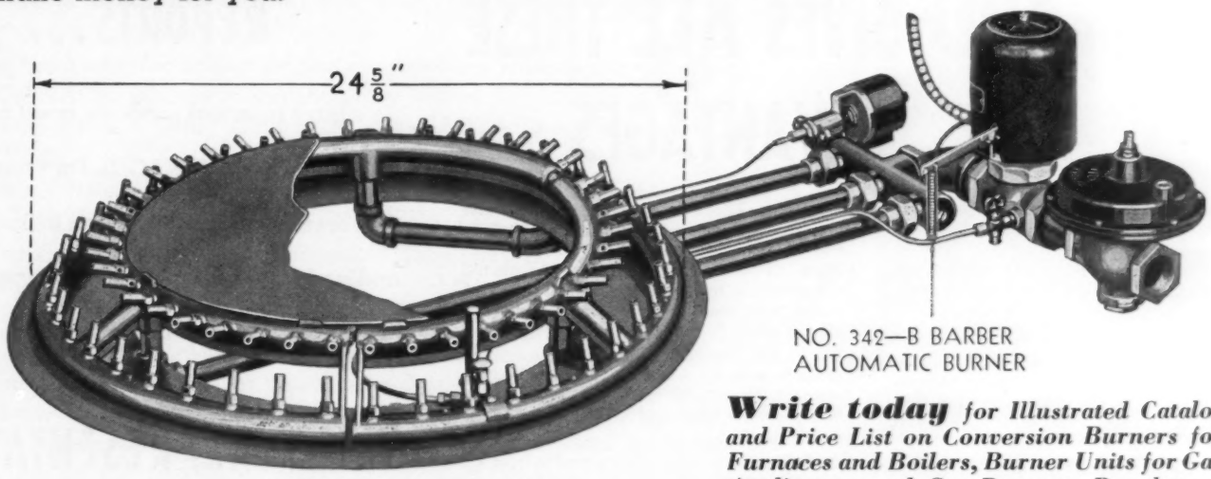

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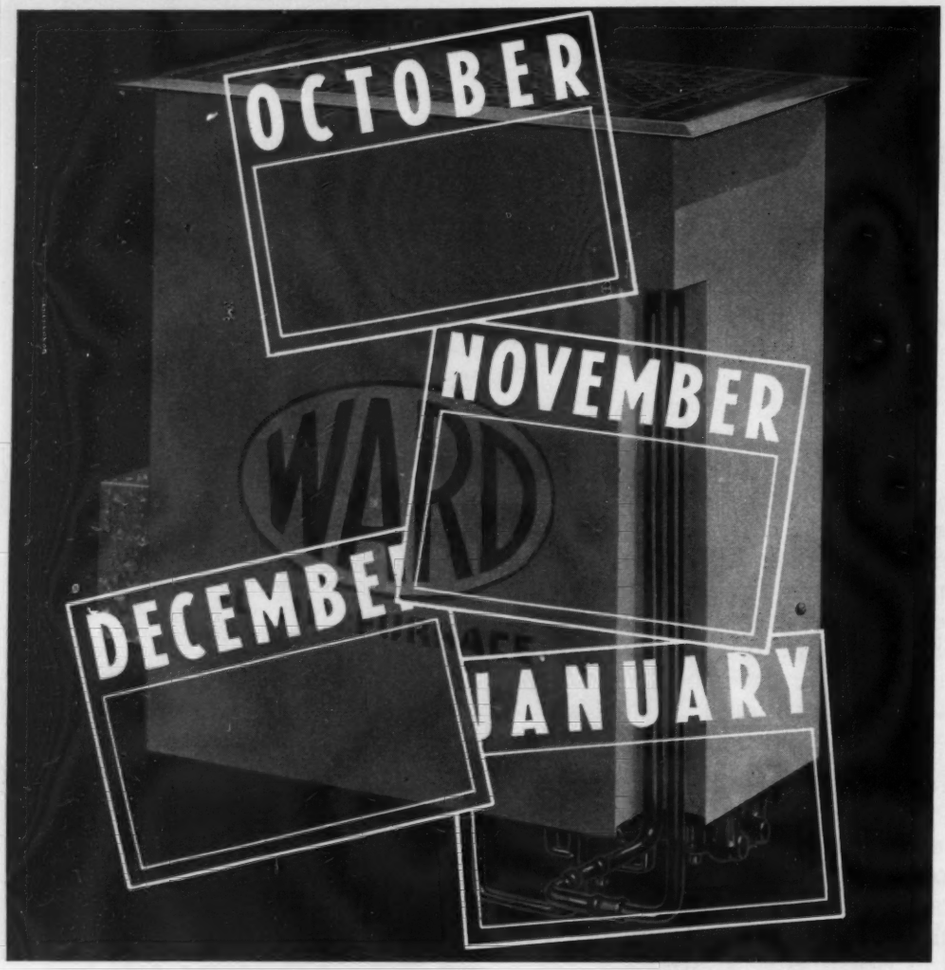
Air Conditioning Equipment ● High Pressure Boilers (Tubular and Tubeless) ● Bakery Ovens ● Doughnut Kettles ● Metal Pots ● Garage Heaters ● Coffee Urns ● Hair Dryers ● Space Heaters ● Floor Furnaces ● Clothes Dryers ● Water Heaters ● Confectioners' Stoves ● Vulcanizing Machines ● Pressing Machine Boilers ● Japanning Ovens ● Core Ovens ● Banana Room Heaters and Many Other Appliances

BARBER *Automatic* JET GAS BURNERS

FOR WARM AIR FURNACES, STEAM & HOT WATER BOILERS



The

READ WHAT ONE GAS COMPANY EXECUTIVE REPORTS...

"We have in actual service a great number of WARD FLOOR FURNACES. For your information, they are all a satisfaction to their owners and a pleasure to us because they satisfy the customers and give us no servicing trouble."

ONLY WARD GIVES ALL THESE SUPERIOR ADVANTAGES

Complete Package Assembly—The WARD FURNACE is complete in itself. All controls and accessories are built in. There are no external parts, no wires, no fragile connections. Nothing to get out of order, nothing to wear out. Long life and service assured.

Bilt-In Thermo-Control—An *exclusive* WARD feature. Not a separate accessory. Control gauge and thermostat are part of furnace. No wires to run, no difficult installation. Contacts air as it passes through furnace, giving unusually accurate warmth control.

Sealed Lighter Door—Made of brass. Screws into cast iron flange on top of combustion chamber. Brass expands more than cast iron under heating, *hermetically seals* fire box.

Toncan Iron Construction—WARDS are built of 16 and 18 gauge, copper-bearing and rust-resisting, Toncan Iron. Heating element is hand acetylene welded throughout to insure strength, durability, tightness against gas leakage.

Flame Fender—Cast iron lining surrounding burner. Keeps flame from impinging on any vulnerable part. Prevents burning out. Assures long life.

Slotted Burner—Bunsen type. Heavy cast iron with raised slotted flame tips. Consumes 100% of the gas. Burns with a steady blue flame. Noiseless, self-cleaning.

Gas Pressure Regulator—Insures even gas flow at all pressures, increasing heat efficiency by equalizing any fluctuation of main line pressure.

Automatic Pilot—Pure brass valve, outer rod of copper with chromium tip. Comparative tests prove amazingly quick action. Shuts off main intake immediately should gas pressure fall or flame be extinguished. Burns with steady blue flame. Consumes all the gas.

100% Air Chamber Circulation—WARD gives free circulation on all sides of heating element. Especially insulated vent connection prevents radiating heat from interrupting circulation.

Draft Diverter—Keeps down drafts from extinguishing pilot or burner. Prevents heat escape through vent.

Copper Vent Connection—Nipple outlet connecting draft diverter to flue pipe is made of copper, impervious to moisture. Will not rust out.

Cradle Circulator—Increases circulation efficiency as much as 20%. Reduces down drafts. Makes air movements steady and continuous. Draws air of room through the furnace three to six times an hour.

Removable Register—Cast iron with oxidized brass finish. Made in two sections. Air enters at outer edges, emerges from center section, thus radiating heat does not interfere with circulation. Entire register removable for cleaning.

Insulated Inner Shell—Asbestos insulation attached to shell with galvanized iron discs. Dust-proof collar prevents dust and dirt from entering furnace. Inner shell can easily be lifted out of furnace.

WARD REPRESENTATIVES

NEW YORK—
Herbert A. Lovell, 455 Chanin Bldg.

PITTSBURGH—
H. C. Sanderson, 207 Fulton Building

CHICAGO—
J. E. Davies, Peoples Gas Building

KANSAS CITY—
J. H. Stubbins, 300 E. 68th Terrace

DALLAS—
A. S. Kincaid, 2012 N. Harwood Ave.

SAN FRANCISCO—
Robert J. Mullen, 557 Market Street

YOUR LOAD IS AS GOOD AS THE APPLIANCE YOU SELL!

time has come!

...the time has come for all good merchandisers to come to the aid of their HEATING LOAD *with...*

WARD FLOOR FURNACES

OCTOBER is here. November...December...January... ahead. To the gas man these months mean *heating load.* To the gas man *who sells WARD FLOOR FURNACES* these months mean an opportunity to do a job of load-building that will last for years to come. That's because WARDS are *permanent* appliances that keep the consumer sold on the *efficiency* and *economy* of gas for fuel.

During the next three or four months *more* utilities will sell *more* WARD FLOOR FURNACES in *more* places than ever before. We know that to be a fact because we've already shipped *more* WARDS to them than in any previous year.

Where will these WARDS be sold?

They will be sold as principal heating systems for one-story homes... where thousands upon thousands of installations have proved them able, helpful allies to gas company load-builders.

They will be sold for use in stores, beauty salons, barber shops, restaurants and other one-story commercial establishments. Such places seldom have adequate heat. In them space is at a premium. WARDS... hanging beneath the floor, taking no valuable space, pouring comfortable, controlled, vented warmth directly into the room... are ideal for these purposes and here offer a load-building opportunity not to be overlooked.

They will be sold as *auxiliary heat* in many homes now expensively warmed with other fuels. That's such an important load-building item that we think you should read the paragraph at the right about it.

When you sell a WARD FLOOR FURNACE you accomplish two purposes. You make an excellent *profit* for your merchandising department ...and you add a load *profit* that will pay your company long and well. *Now is the time!* Ask us for catalog, price lists and detailed facts. We'll have them in your hands by return mail!

WARD HEATER COMPANY
LOS ANGELES, CALIFORNIA

A "HOT TIP"
FOR BUSY MERCHANDISERS

Here's a "hot" merchandising angle on the WARD FLOOR FURNACES. It is important to your company or to any other company that makes a business of selling gas. With a single WARD FLOOR FURNACE you can get into a home or store that is now heated with a competing fuel. A WARD used as auxiliary heat in early fall or late spring, or to overcome a special problem in any season, will quickly convince the home-owner of the desirability, economy and efficiency of gas for heating.

SELL THE BEST . . . . SELL WARD FLOOR FURNACES

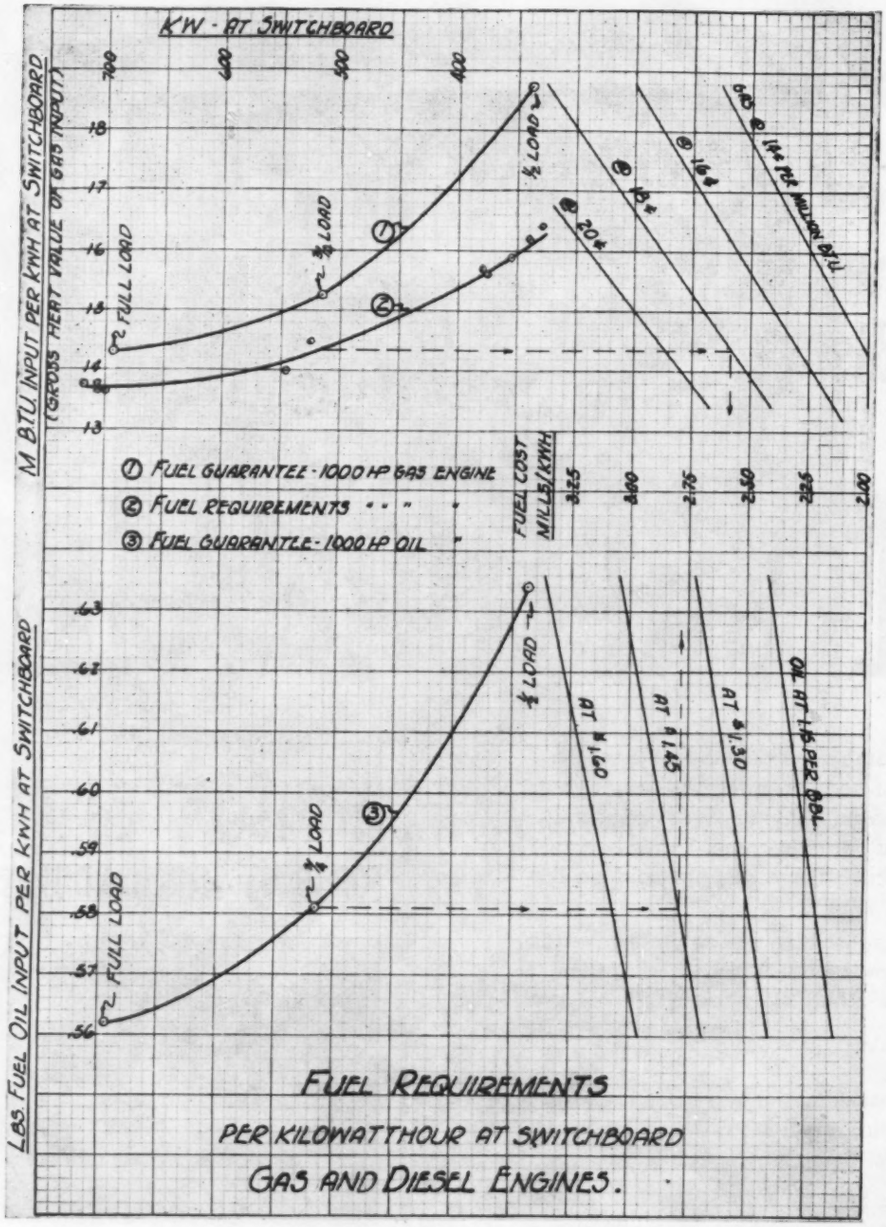

KW - AT SWITCHBOARD
M BTU INPUT PER KWH AT SWITCHBOARD (GROSS HEAT VALUE OF GAS INPUT)
FULL LOAD
¾ LOAD
½ LOAD
@ 18¢
@ 16¢
@ 14¢ PER MILLION B.T.U.
① FUEL GUARANTEE - 1000 HP GAS ENGINE
② FUEL REQUIREMENTS " "
③ FUEL GUARANTEE - 1000 HP OIL
FUEL COST MILLS/KWH
LBS FUEL OIL INPUT PER KWH AT SWITCHBOARD
AT $1.60
AT $1.45
AT $1.30
OIL AT 1½ PER GAL.
FUEL REQUIREMENTS
PER KILOWATTHOUR AT SWITCHBOARD
GAS AND DIESEL ENGINES.

FIG. 1. Fuel requirements per kilowatt hour at switchboard for gas and Diesel engines.

Notes on the Installation of a 1000-hp. Gas Engine

By F. H. COUGHLIN

Vice-president and General Manager
Empire Southern Gas Company

THE municipal electric plant at Brady, Texas, has, as its newest unit, a 1000-hp. gas engine. Studies in connection with its selection, and observations from tests and operation have provided random notes which may be helpful to local and district managers—non-engineers for the most part—in considering the adaptability of this type of engine to their market requirements. In this instance, "buyer's" operating experience was confined entirely to Diesel engines, hence these notes emphasize comparative features.

The engine installed was a Worthington 1000-hp. 4-cycle, gas-convertible engine (that is, one which may be made Diesel by change of parts). It has eight cylinders 18x25 with a piston speed of 937.5 per minute when operated at 225 r.p.m. The fuel guarantee on this engine was not conventional since it was expressed in effective B.t.u. of the gas fuel rather than the customary gross B.t.u. The fuel guarantee expressed in those terms was as follows: full load, 9000 B.t.u. per hp.-hour; three-quarter load, 9500 B.t.u. per hp.-hour; half load, 11,500 B.t.u. per hp.-hour, all ratings at sea-level.

It is to be noted that the above engine guarantees were expressed—as are all engines—in terms of the "brake horsepower." Brake horsepower is defined in handbooks and, as intended above, is the output of the engine itself. In this instance it was convenient to measure the fuel requirements and rating points of the engine in terms of the output of the generator to which the engine was direct-connected—that is, by the customer's switchboard instruments. Obviously power is lost in the generator in converting the engine's mechanical energy to electric energy, consequently due allowance must be made for the generator efficiency and other losses. The various horsepower "guarantee points" are converted to switchboard equivalents in the manner detailed in Table No. 1.

Through Table No. 1 it is determined that a reading of 694 kilowatts on the switchboard meter is the equivalent of 1000 brake horsepower output at the engine, etc.

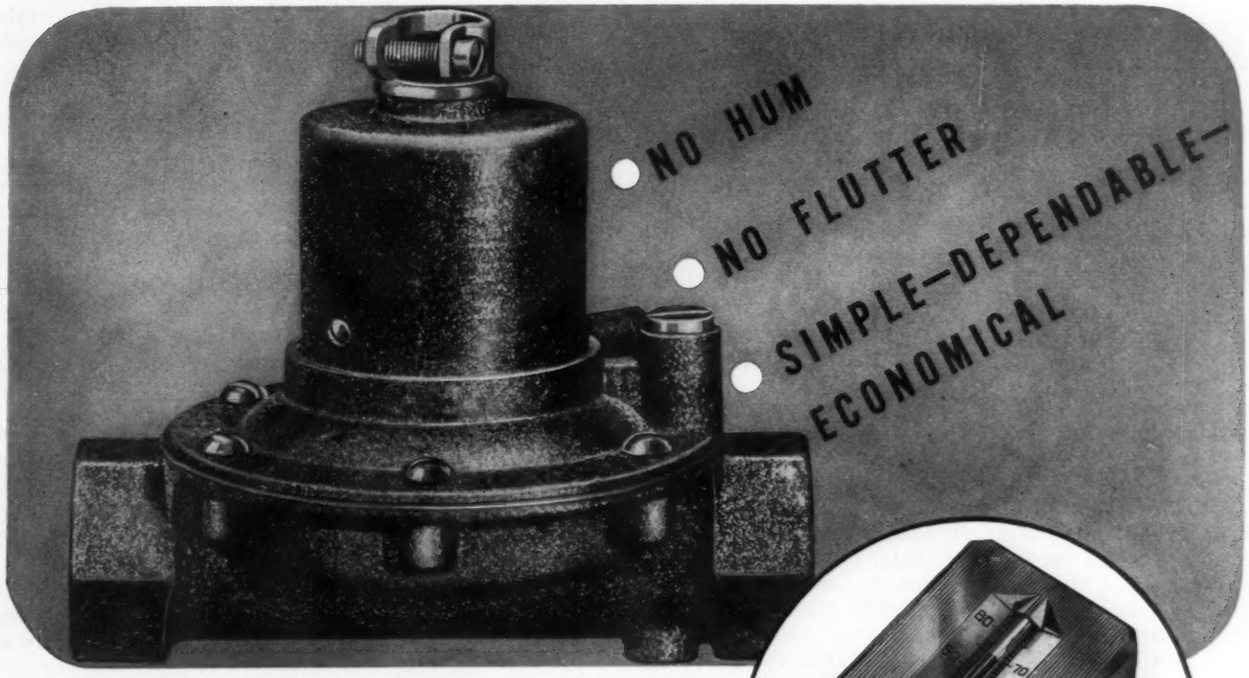
The fuel guarantees, as noted above, were expressed in terms of "effective B.t.u." which is about 90.5 per cent of the gross B.t.u. in which latter term the heat value of a cubic foot of gas is normally expressed.* The fuel guarantee was further expressed as the input per brake horsepower-hour. Since it was desired to read the horsepower-hour output on the switchboard watthour meter—therefore in terms of kilowatt hours generated—it was necessary to convert hp.-hours to kw. hrs. in a manner similar to the previous computations, allowing for the same losses. (See Table No. 2.)

In Table No. 2 the generator effi-

* Circular 405, Bureau of Standards, page 5. Exact percentage must be determined from gas analysis. See table on page 100, Gas Engineers Handbook.

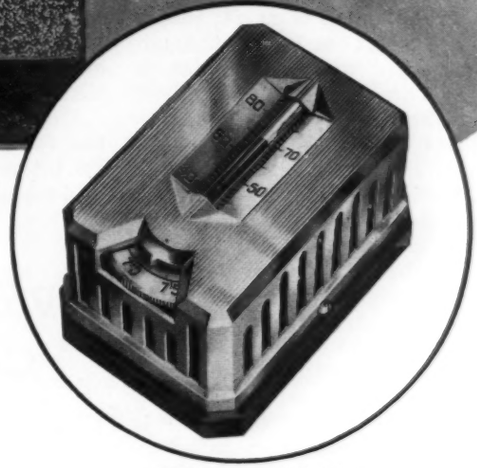
New Klixon

Electrically operated Gas Valve



Here is a diaphragm type control valve which is designed to eliminate electrically operated gas valve troubles. Actuated thermally by a built in snap acting rate-of-rise electric head of the Spencer thermostatic disc type, it is hum free and unaffected by changes in ambient. It is simple in construction, dependable in operation, economical in performance. The electric head, consuming only 9 watts when "on", opens and closes a small bleed valve, which in turn controls the main diaphragm valve. Operating time delay is approximately 30 seconds "on", 30 seconds "off", preventing fluttering of the main valve in the event of momentary interruptions in the control voltage.

Universally adaptable, this new KLIXON valve is mounted in the main gas line at the heater, and operated remotely by a snap acting KLIXON room thermostat or other KLIXON electric control. Valve sizes from ⅜" to ¾" I.P.S. with capacities of from 100,000 to 195,000 BTU are available in both full "on-off" and manually adjustable by pass types for low flame operation. Can be furnished for 110V. or 12 Volt A.C. installations.



OPERATED BY LINE
OR LOW VOLTAGE THERMOSTAT

You can operate the new KLIXON diaphragm gas control with any KLIXON Electric Thermostat. Installation is unusually easy.

KLIXON

TRADE MARK REG. U.S. PAT. OFF.

SEND FOR
THIS NEW
48 PAGE
CATALOG

Just off the press. The new KLIXON Catalog. Forty-eight pages, crammed with a complete line of snap acting controls for all types gas-operated equipment. Get your free copy. Write.

SPENCER THERMOSTAT CO., 709 FOREST ST., ATTLEBORO, MASS.

TABLE NO. 1

	Full Load	¾ Load	½ Load
Brake hp. at which maximum fuel requirements were guaranteed	1000	750	500
Brake kw. equivalent to above	746 kw.	559 kw.	373 kw.
Generator Efficiency — Manufacturer's Ratings	93.9%	93.6%	93.0%
Kw. after adjustment for above	700 kw.	523 kw.	347 kw.
Rheostat and misc. electrical losses	0.9%	1.4%	2.3%
Switchboard reading at guarantee points	694 kw.	516 kw.	339 kw.

TABLE NO. 2

	1000 Brake hp. (694 kw. @ SB)	750 Brake hp. (516 kw. @ SB)	500 Brake hp. (339 kw. @ SB)
"Effective B.t.u." per brake hp.-hr.	9,000	9,500	11,500
Gross or B.t.u. per brake hp.-hr.	9,945	10,498	12,708
Gross or B.t.u. per brake kw.-hr.	13,331	14,072	17,035
Generator efficiency	93.9%	93.6%	93.0%
Gross B.t.u. per kw.-hr. after generator loss	14,197	15,035	18,317
Rheostat and misc. losses	0.9%	1.4%	2.3%
Gross B.t.u. per kw.-hr. switchboard	14,325	15,245	18,738

ciencies and electrical losses may be generally assumed for estimating purposes.

Restated, these data mean that no more than 14,325 B.t.u. (gross) input, or its equivalent in cu. ft., should be required to put one kw. hr. through the switchboard when the engine is not using more than 9000 "effective" B.t.u. per hp. hr.

The data derived in Tables No. 1 and 2 permit the plotting of Curve 1 in Fig. 1, which is the fuel guarantee curve. Actual test runs under load conditions provided data for Curve 2 (Fig. 1)—the performance curve—which, incidentally, was considerably better than the guarantee.

Curve 3 (Fig. 1)—the Diesel engine curve—was added for comparative purposes and was derived in a manner exactly similar to Curve 1, using the Diesel engine manufacturer's fuel guarantees: Full load, .39 lbs. fuel oil per brake hp.; ¾ load, .40 lbs. per brake hp.; half load, .43 lbs. per brake hp. The straight line curves at the right of the chart were added for convenience in translating fuel requirements into fuel costs per kw. hr. output.

Conservative Gas Guarantee

The gas engine manufacturer's fuel requirement guarantee was extremely conservative (Curve 1) and much more so than is usual with Diesel engines of comparable size. The conservativeness was particularly marked at half load. This was probably indicated by the fact that there are so few engines of this type in operation to provide data for such close guarantees as to performance as may be done with Diesels. Therefore, from the standpoint of fuel consumption, Curves 2 and 3 are approximately comparable but some deviation might be expected due to the idiosyncrasies of individual engines and specific fuel oils.

Particular attention is directed to the fact that the fuel required per kw. hr. output is not a constant for all load-factors for either gas or Diesel engines. The fuel required in either case, per kw. hr. or hp.-hr. output, is appreciably greater at low load-factor than it is at high load-factor. This is particularly true with the gas engine, consequently selection of the proper size engine has much to do with the fuel economy actually experienced. At 50 per cent load the gas engine fuel requirements are 18 per cent more per kw. hr. than at full load and Diesel engine fuel requirements are 13 per cent more under similar conditions.

Convertible to Diesel

This particular engine is convertible to a Diesel engine which would be rated at exactly the same hp. The running gear, frame etc. is all designed to withstand the greater Diesel stresses, consequently its operation as a gas unit will require appreciably less maintenance. The maximum pressure on gas engine operation is about 350 lbs.—whereas it would be up to 600 lbs. per sq. in. for Diesel operation. One manufacturer writes, "... Our standard practice of comparing Diesel and gas maintenance is based on figures from the American Society of Mechanical Engineering Diesel Engine Report and from operating reports over the country. Our maintenance figures are approximately $2.00 per hp. per year for Diesel engines and $1.00 per hp. per year for gas engines based on 15 or 20 years life of engine."

Porcelain Enamel Institute to Hold Convention and Forum Oct. 11-15

THE week of October 11 will be outstanding in the porcelain enameling industry, according to predictions made by the Porcelain Enamel Institute. This week will be divided into two features:

1. Seventh annual meeting of the Porcelain Enamel Institute in Chicago, October 11 and 12.

2. Second Porcelain Enamel Institute Forum at Ohio State University, Columbus, Ohio, October 13, 14 and 15.

With the largest budget and most imposing program since its organization nearly seven years ago, the Institute, during its first eight months of 1937, has, according to its headquarters office, produced unparalleled results. Basing their proposed 1938 program on this performance, the Institute's various sections will present their plans for next year's operations during the first day of the annual meeting.

On the second day—October 12—general business of the association will be transacted and 1938 officers, executive committee members, and members of the board of trustees will be elected. In addition, there will be speakers from both within and without the industry who will present subjects of general interest to the membership.

The Porcelain Enamel Institute Forum will be held at Ohio State University the same week as the meeting of the Institute in order to reduce traveling expenses for members of the industry, according to F. E. Hodek, Jr., of the General Porcelain Enameling & Mfg. Co., Institute vice-president in charge of this activity for the second time.

R. G. Calton, Tennessee Enamel Mfg. Co., is Institute president.

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MANUFACTURERS of Providence, Hovey T. Freeman, *Pres.*
RHODE ISLAND Providence, Hovey T. Freeman, *Pres.*
BOSTON MANUFACTURERS Boston, Marshall B. Dalton, *Pres.*
FIREMEN'S Providence, Frederick [illegible], *Pres.*
STATE Providence, [illegible], *Pres.*
WORCESTER MFRS Worcester, [illegible], *Pres.*
ARKWRIGHT [illegible], [illegible], *Pres.*
BLACKSTONE [illegible], [illegible], *Pres.*
FALL RIVER MFRS Fall [illegible], [illegible], *Pres.*
MECHANICS Providence, Nelson G. Terry, *Sec'y*
WHAT CHEER Providence, Hovey T. Freeman, *Pres.*
INTERIOR Providence, Charles C. Steven, *Pres.*
MERCANTILE Providence, Hovey T. Freeman, *Pres.*
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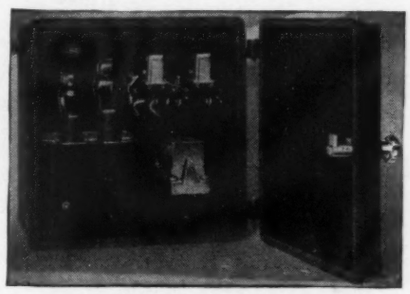
TELEPHONE HANCOCK 7330

Approved By

FLAME UNIT

PILOT FLAME

This Flame Safeguards Itself



RE-LITE RELAY BUILT TO WORK WITH FURNACES

Above Re-Lite protective relay unit may be placed on a central control board or remotely installed in the furnace room. Indifferent to heat, dirt, moisture, etc., it is as rugged as the furnaces themselves. The vacuum tubes are sturdy commercial radio types, and the transformer, besides being sheltered in the main case, is of the heavy duty type. It is capable of withstanding the severities of industrial conditions. At the burner is the Flame Unit — merely a rod of heat-resistant alloy, mounted in a high grade porcelain insulator, that contacts the flame. Also, means are provided for using compressed air to prevent accumulation of carbon. These features, and many others, are the results of several years' experience in overcoming one of the toughest problems in all industry.

IN the operation of automatic burners — where pilot flame failure causes gaseous mixtures to form in cumbustion chambers, jeopardizing the safety of men and equipment, Brown Protectoglo System provides utmost safety and protection against possible hazards of explosion and fire. The flame terminal unit is installed so that it is continuously in contact with the pilot flame itself. The flame, being a conductor of electrical current, will energize the relay circuit to keep the fuel valve open. If the pilot flame should fail to contact the terminal unit, the electrical circuit will be broken and the fuel valve will be instantly closed. It then re-ignites, automatically, the pilot flame within a predetermined time to resume normal operations. There are no mechanical parts to get out of order — no temperature fluctuations to be considered. Brown Protectoglo System is approved by the Laboratories of The Associated Factory Mutual Fire Insurance Companies. Brown Instrument Company, a division of Minneapolis-Honeywell Regulator Company, 401 East Twenty-eighth Street, Minneapolis, Minnesota. Branch and distributing offices in all principal cities.

COMBUSTION SAFEGUARD

Protectoglo SYSTEM

Removing Pipe Line Scale in the Signal Hill Field

By A. R. YORSTON
Oil Operators, Inc.

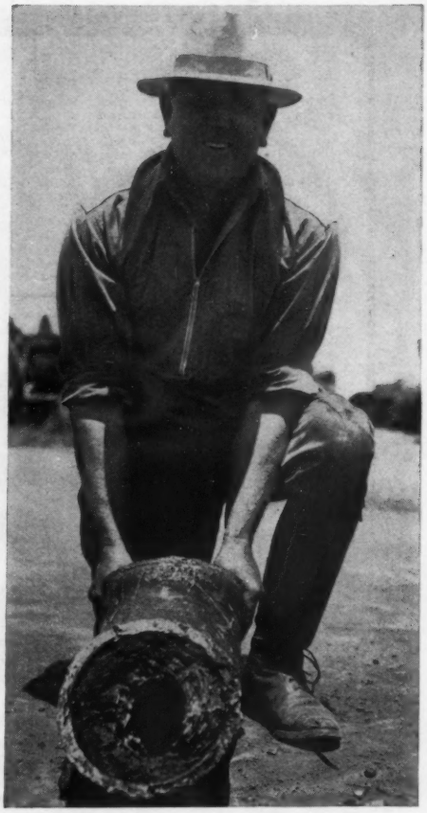
THE problem of the disposal of waste water from oil fields and refineries is troublesome enough in itself, but in the Signal Hill Field, Calif., we have encountered a condition which may occur in other regions and, for that reason, I am glad to present a solution which has worked out with complete success and at a great saving for us.

We operate a total of 14 miles of line, running from the wells and refineries in Signal Hill to the settling ponds in Los Cerritos where drilling mud and sand — also sediment from producing wells and refineries—is allowed to settle and the oil is removed before the water passes on into the Pacific. These lines carry 70,000 barrels of water per day and it is essential that they be kept open in order that producing, drilling and refining operations are not forced to suspend.

The 8-inch portion of these lines was laid about 20 months ago and the 6-inch lines, about 3 years ago. While still new, they provided ample capacity to carry the required gallonage of water. However, the combination of oil field waters and refinery waters, as they met in the lines, produced a hard, flinty scale which soon began to reduce the capacity and by the Spring of this year had accumulated to a thickness of ¾-1½ inch in the 6-inch lines and had closed the 8-inch lines to but a 2-inch opening. Obviously, this seriously reduced the capacity of the lines to the point where it was necessary either to dig up the affected portions of the system and lay new pipe or find some method for removing the scale.

A machine known as the Werko Sewer Sweep had been in use on the lines of the Los Angeles Terminal Warehouse and had operated successfully on many different types of stoppage and we decided to try this machine in an effort to eliminate the delay and expense that would be incurred by having to dig up and replace our lines. The first machine tested was a small unit, powered by an electric motor operated by a portable generating set. With this machine, we cleaned 1800 feet of 6-inch line to its original diameter.

Some experimentation was necessary in order to develop the correct type of cleaning or cutting head but, with the cooperation of the Geo. H. Werfelman Co., manufacturers of the machine, we were successful in developing heads which made it possible to clean an average of 450 feet of line per day. No digging was required except to cut the line at intervals of several hundred feet. This, however, was a much simpler and less expensive task than digging up the entire line, not to mention the saving in pipe cost.



A. R. Yorston shows a section of pipe clogged with hard flinty scale. Without digging up the line, scale of this nature was successfully removed by the Werko Power Pipe Sweep.

The Werko Power Pipe Sweep in action. Operated by one man, it is possible to clean an average of 450 feet of pipe line per day.

With the success of the smaller Werko model established, a larger, heavier machine, mounted on a trailer and powered by a four-cylinder engine was produced and we put this to work on our 8-inch lines. A total of more than 1600 feet of 6- and 8-inch line has been cleaned to date and at the rate this machine is operating, it will not take us long to complete the remaining 2,500 feet which is affected by scale accumulation.

Thus, we have not only saved at least 50 per cent of the cost of labor and material required to dig up the line and replace it, but we have saved considerable annoyance and inconvenience to the public in and around Long Beach by eliminating digging up streets and highways, as well as eliminating inconvenience and losses to operators using the lines due to shut-

Congratulations ON ANOTHER RECORD-BREAKING CAMPAIGN

"Tenth Anniversary" Party
BOOSTS GAS REFRIGERATION HOMES PAST 1,000,000 MARK

Surveying one of the giant cakes awarded to the twenty-four winning companies in this year's "Birthday Party" campaign: F. E. Sellman, vice-president, Servel, Inc.; J. W. West, Jr., commercial secretary, A. G. A.; Hall M. Henry, assistant to vice-president, The Utility Management Corp.; C. W. Berghorn, executive secretary, A. G. A. E. M.; H. S. Boyle, sales promotion manager, Servel, Inc.

Each of these mammoth fruit cakes weighed 150 pounds. This was the largest batch of birthday cakes ever made. They were baked in Schrafft's New York ovens and were only made possible through use of traveling gas ovens.

WELL, you people were the life of the party. And what a party it was! Other gas refrigeration campaigns have been great. But this year's "Tenth Anniversary" celebration topped them all.

Because of your energy and cooperation, our "Birthday Party" was a huge success from two standpoints: First, it resulted in a record number of actual installations. Second, it stimulated public interest to an unprecedented degree. That interest will carry on through future months . . . will give you a chance to do more refrigeration business this fall and winter than you've ever done before.

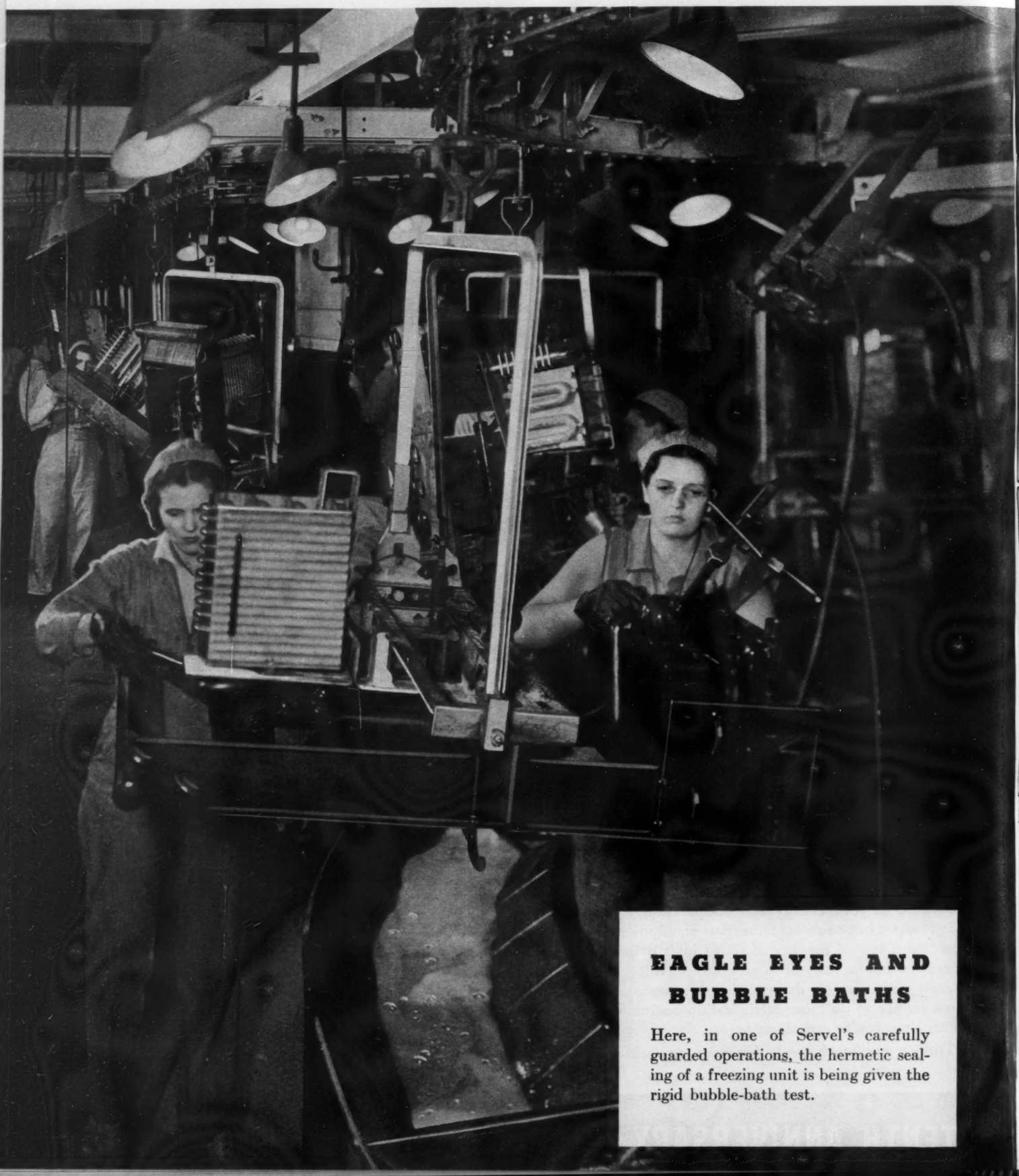
There's not much more for your committee to report. Those great whopping cakes have been shipped by plane to the twenty-four winning companies and are already being eaten, no doubt. Individual cash awards have been mailed. In all, there were approximately 2000 awards and we wish there could have been more. All we can say now is—Congratulations . . . and thanks.

REFRIGERATION COMMITTEE
OF THE
AMERICAN GAS ASSOCIATION AND THE A. G. A. E. M.
HALL M. HENRY, *Chairman*

Henry Dropp B. H. Gardner A. G. Schroeder John W. West, Jr.
Clyde Potter Paul J. Naschold B. O. Brown C. W. Berghorn

"TENTH ANNIVERSARY OF GAS REFRIGERATION" CAMPAIGN

Servel's Bubble-Hunters



EAGLE EYES AND BUBBLE BATHS

Here, in one of Servel's carefully guarded operations, the hermetic sealing of a freezing unit is being given the rigid bubble-bath test.

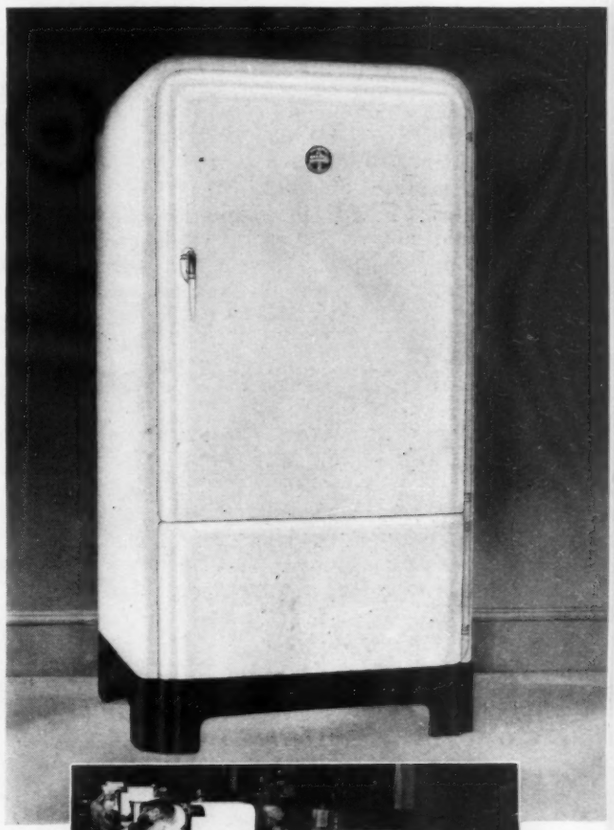
help the gas industry too

Another unusual test that produces a better appliance for your customers

THESE GIRLS were chosen for the sharpness of their eyes. Their job is to watch for bubbles.

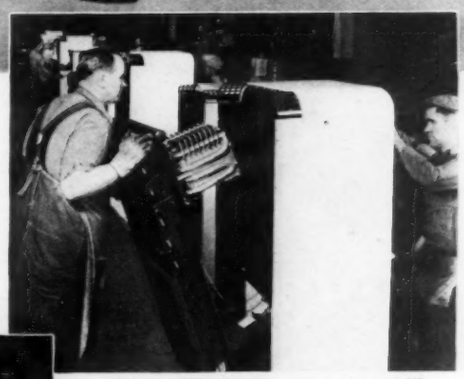
To test hermetic sealing, every Servel Electrolux freezing unit is filled with compressed air at a pressure of one hundred pounds per square inch. Then, a girl coats its outer surface again and again with a film of soapy water. At the first sign of a bubble—the merest hint of imperfection—she marks the spot for re-welding.

The bubble-bath is only one of the many operations and tests employed in the Servel plant. The result of such manufacturing care is a better, more efficient refrigerator—an outstanding product that is continually mounting in popularity. This primarily benefits the company itself. But it also means that the efficiency of gas and gas service is being actively demonstrated to more and more people every year.



SERVEL ELECTROLUX

THE *Gas* REFRIGERATOR

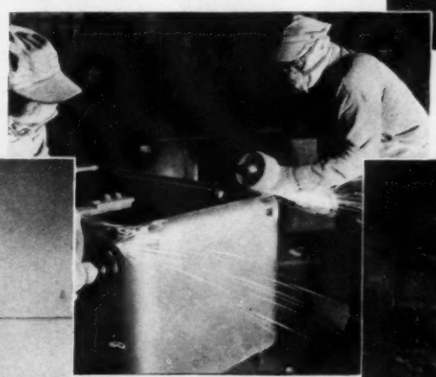


(*above*) ASSEMBLING the cabinet shell and freezing unit.

(*below*) TESTING the color of the NEW-TONE finish.

(*right*) BURNISHING the surface of a Servel Electrolux cabinet.

(*below*) SAND-BLASTING gives a satin finish to the chilliator.



downs which would have been necessary while the new line was being laid.

With the Werko, we can clean our lines at a minimum cost as required and, by preventing scale accumulation from reaching an extreme degree, can secure the maximum capacity from our lines at all times. At the same time, the saving we have effected is a substantial item contributing to our satisfaction, as well as our profit.

The method of operation employed by the machine used on our lines is quite simple. Tools or cleaning heads of various types are coupled to the end of the special oil-tempered spring wire which is wound on a reel. The reel is mounted in a carriage which rotates around its longitudinal axis, perpendicular to the reel axis. In operation, the carriage revolves, imparting a rotary motion to the wire and cleaning head while the rotation of the reel itself is controlled so as to feed the cleaning head and wire into the pipe, draw it out, or hold it stationary while simultaneously rotating the head and wire.

The wire is held securely on the reel by patented fingers which are opened and closed automatically by a cam, to clear the wire as it is fed in or out. These steel fingers give the required pushing power to advance the cutting head without allowing the wire to buckle on the reel. Special controls allow the operator to vary the speed of rotation and feed to suit any conditions, with maximums of 750 r.p.m. and 100 ft. per minute, respectively.

A special head having a number of rotary cutters was developed for removing the hard scale in our lines. With a tool of this type, the rotating spring wire imparts a rotary whipping action which effectively cuts and knocks loose any hard substance in the pipe. Only one man is required to operate the machine and, with its specially built trailer, it can be pulled from one job to another by any passenger car. This adds still another labor-saving advantage to the others already mentioned.

With the Werko Power Pipe Sweep in operation, our problem of removing scale and keeping our lines in efficient operating condition has been solved, and profitably so. From our experience, it would seem that this machine could be applied successfully to the cleaning not only of waste water lines but all types of pipe lines where stoppage of any nature occurs, using a cutting head designed to penetrate and break up the material causing the stoppage.

Chicago and Los Angeles Natural Gas Companies Take Premier Awards in P. U. A. A. Better Copy Contest

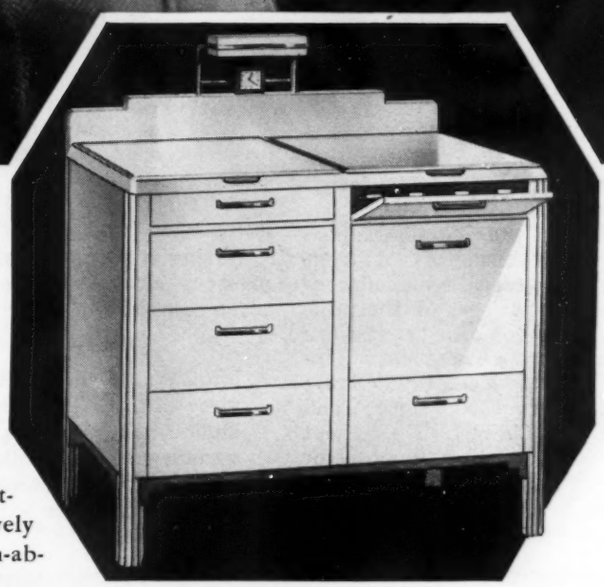
IT'S A SHAME TO MISS THAT PICTURE ...BUT I HAVE TO HURRY HOME TO FIX THE FURNACE!
NOT ME...WE HAVE GAS HEAT!
TODAY ONLY
MODERNIZE YOUR HOME With GAS
CALL WABASH 6000 TODAY FOR AN AUTHENTIC ESTIMATE OF THE COST OF GAS HEAT FOR YOUR HOME!
MODERN COOKERY . . CONSTANT HOT WATER . . SILENT REFRIGERATION . . GAS HEATING
THE PEOPLES GAS LIGHT AND COKE COMPANY

To The Peoples Gas Light and Coke Co., Chicago, Ill. went the premier award for gas load building newspaper advertising in the P. U. A. A.'s 1937 Better Copy contest.

NOT MUCH SMOKE IN ONE CIGARETTE
— NONE AT ALL IN NATURAL GAS
SMOKELESS skies here — and spotless kitchens, too — because of Natural Gas. Under giant boilers and in modern ranges, Natural Gas burns clean.
Its flexibility helps to make Natural Gas the cleanest of all fuels for cooking. The heat under a vessel can be just right — not merely low, medium or high — so there need be no excess vapors from seething liquids and fats, no smoke from scorching foods to soil walls and hangings. Since Natural Gas delivers any cooking temperature instantly, there is no urge to try to make up for a lagging start by a hurried, smoke-fogged finish.
Ask your dealer or Gas Company to show you the new appliances designed to take full advantage of the unmatched cleanliness, convenience and economy of Natural Gas.
LOS ANGELES GAS AND ELECTRIC CORPORATION
SOUTHERN CALIFORNIA GAS COMPANY
SOUTHERN COUNTIES GAS COMPANY
FOR MODERN USES Natural Gas

Above is shown one of the advertisements which brought the three companies operating in Los Angeles, Calif. the premier award for gas public relations newspaper advertising.

Porcelain Enamel, Madam, is as easy to clean as a china plate



● "Indeed, Madam, that's virtually what porcelain enamel is . . . A kind of glass, supported by sheet steel.

"You see, porcelain enamel is a mineral substance through and through—color pigments and all. And this mineral substance has been fused or welded onto its supporting metal base by the intense heat of 1550 degrees. That intense heat makes porcelain enamel flint-hard. It gives porcelain enamel its lovely surface lustre—which is absolutely non-absorbent and which never fades or dulls.

"That's why you can clean your porcelain enameled appliance just as easily as you can wash a dish. And, of course, that means that your appliance is always absolutely sanitary."

Mr. Dealer: Write for a copy of our "Sales Manual for Porcelain Enamel." It is both free—and full of ideas which will help your sales people make both higher profits and happier customers.

EDUCATIONAL BUREAU
PORCELAIN ENAMEL INSTITUTE, Inc.
612 North Michigan Avenue
Chicago

DURABILITY PORCELAIN ENAMEL Fused on Metals

PORCELAIN ENAMEL THE Lifetime Finish

A general view of the Haven compressor station on the Panhandle system.

Panhandle Eastern Pipe-Line Project

(Continued from Page 23)

tion of *G A S* presents articles covering Panhandle Eastern Pipe Line Co.'s expansion program of a year ago, and facts tracing the company's growth.

Compressor Stations

In the fall of 1931 the 860-mile main transmission line of the Panhandle system, running between Moore County, Texas, and a terminus near Dana, Ind., on the Illinois-Indiana state line, was completed. At that time because of general economic conditions and the newness of the project, only three compressor stations were constructed. These were installed at Liberal, Kan. (5000 hp.); Louisburg, Kan. (5000 hp.); and Glenarm, Ill. (4000 hp.). Throughout the depression years these compressor facilities proved adequate to handle the existing load requirements.

In the latter part of 1935, however, the Panhandle Eastern company was launched upon its program of phenomenal expansion with the signing of a contract to supply natural gas to Detroit City Gas Co. (See Detroit Souvenir issue of *G A S*, Sept., 1936). The construction program needed to meet this expanded activity was started on May 1, 1936 and was completed by November 15 of that year.

During 1936, a total of 27,300 compressor horsepower was installed in seven new stations, while an additional 2000 horsepower was added to the existing station at Liberal, making a total of 29,300 horsepower, or in other words, increasing the system's compressor horsepower to a total of 43,300. In connection with the 1936 Panhandle system construction program Michigan Gas Transmission Corp. erected a 2600-horsepower station at Montezuma, Ind.

1937 Program Planned

At the close of 1936 it was apparent that further facilities on the system would be necessary to meet the demands made by both the winter peak and by the opening of new markets along the route of the line. This necessity for expansion of transmission facilities resulted in the 1937 construction program.

All compressor station construction

BELOW: (At left): An interior view of the Haven compressor station, showing the auxiliary generators. (At right): Set of six 1300-hp. compressors installed in the Olpe station.

MORE
STARS
IN YOUR SHOW OF
PROFITS

AGP Gravity Warm Air Furnaces
AGP Floor Furnace
AGP Unit-Cr
AGP Storage Water Heaters
AGP Convertors

★ A popular newcomer in air conditioning — the **AGP** *Type 2-FE Air Conditioner is new from the ground up. Many exclusive features. Operates on a new principle. Makes quick, easy sales and profits.*

★ Famous for better performance — the **AGP** *"Empire" Ideal Gas Boiler comes in a full range of sizes for steam or hot water systems. It is the world's most beautiful GAS boiler . . . economical . . . dependable.*

THE BIG Fall sales show is on! Here, there — everywhere homeowners are in the market for new heating, air conditioning and hot water equipment.

Your customers want to see the stars — show them the complete **AGP** line. Lead off with the new Type 2-FE Air Conditioner and the famous "Empire" Ideal Gas Boiler. Follow up with the new **AGP** Floor Furnaces, the new Gravity Warm Air Furnaces, the new Unit-Or, Storage Water Heaters, and Convertors.

Display this galaxy of **AGP** stars backed by the best known name in GAS-FIRED equipment. Backed by liberal guarantees. Steal the big sales show — win new profits. Get all the facts right now! Write to —

AMERICAN GAS PRODUCTS CORPORATION
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
40 WEST 40TH STREET · NEW YORK, N.Y.

TABLE NO. 1. PANHANDLE EASTERN PIPE LINE COMPANY'S COMPRESSOR STATION EXPANSION PROGRAM

Station	Horsepower: Initial Installation 1931	1936 Additions	1937 Additions	Total	No. of Units	H.P. of Units
Sneed, Texas	—	3,900	—	3,900	3	1300*
Liberal, Kansas	5,000	2,000	3,000	10,000	10	1000†
Greensburg, Kansas	—	3,900	3,900	7,800	6	1300*
Haven, Kansas	—	3,900	3,900	7,800	6	1300*
Olpe, Kansas	—	3,900	3,900	7,800	6	1300‡
Louisburg, Kansas	5,000	—	2,000	7,000	7	1000†
Houstonia, Missouri	—	5,200	1,300	6,500	5	1300*
Centralia, Missouri	—	3,900	2,600	6,500	5	1300‡
Pleasant Hill, Ill.	—	2,600	3,900	6,500	5	1300‡
Glenarm, Illinois	4,000	—	1,000	5,000	5	1000†
Tuscola, Illinois	—	—	3,900	3,900	3	1300‡
TOTALS	14,000	29,300	29,400	72,700	61	

*Type 24, 1300 hp., 36-inch stroke double acting twin tandem Cooper-Bessemer. Total number installed on Panhandle system: 20.

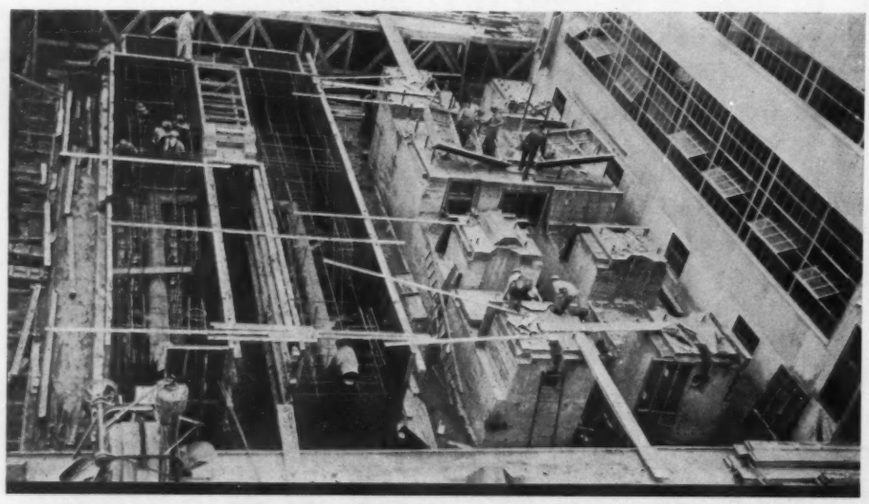
†Type 22, 1000 hp., 36-inch stroke double acting twin tandem Cooper-Bessemer. Total number installed on Panhandle system: 22.

‡Worthington Pump & Machinery Corp., 1300 hp., 36-inch stroke double acting twin tandem engine. Total number installed on Panhandle system: 19.

activities on the 1937 Panhandle system program are expected to be completed this month. Building this year, as last, began early in May. The earlier completion date is because of the fact that only one new compressor station is being erected by Panhandle this year—a 3900-hp. station at Tuscola, Ill. Including the new station, the construction plan involves the addition of 29,400 horsepower to the 43,300 horsepower now installed and in operation. Compressor horsepower on the Panhandle system now totals 72,700. A breakdown of this added horsepower by compressor stations is shown in Table No. 1.

The new Tuscola station, as well as the additions to stations at Glenarm and Pleasant Hill, Ill.; Centralia and Houstonia, Mo.; and Louisburg and Olpe, Kan., are being constructed by The Fluor Corp., Ltd. The additions at Haven, Greensburg, and Liberal, Kan., are being done by Stearns-Roger Mfg. Co. of Denver, Colo. The Fluor Corp. is also building a new 5200-hp. station at Zionsville and a 2600-hp. addition at Montezuma, both in Indiana, for Michigan Gas Transmission Corp., which carries the gas from Illinois-Indiana line to Detroit.

During the 1936 program the initial air cooled mufflers and heat economizers were installed only on the new stations, but as performance has been satisfactory, these units are now being installed not only on the new units and stations, but also on all of the old units completed in 1931. The mufflers and heat economizers were developed by The Fluor Corp.



Seen in progress is the concrete foundation for one of the 1300-hp. compressor units to be installed in the station at Centralia, Mo.

Muskegon Centennial Offers Gas Appliance Display

AN air-conditioned building for the display of gas appliances was erected by six Michigan gas utilities at Muskegon, Mich., for the Muskegon Centennial, which attracted 231,000 persons during the two weeks that it continued from July 17 to 31. The building measured 30x60 ft.

Companies that contributed to the expense of the exhibit were Muskegon Gas Co., Battle Creek Gas Co., Michigan Fuel and Light Co., National Utilities Co. of Michigan, Grand Rapids Gas Light Co., and Washtenaw Gas Co.

H. S. Parker, superintendent of distribution, and Arthur F. Dahlman, assistant sales manager, Muskegon Gas Co., were in charge of the preparation of the gas industry's exhibit.

The air-conditioning equipment used a Waukesha Gas engine compressor unit and a Young radiator. Continental Motor Co. displayed a gas-driven lighting plant which was connected to a portion of the lighting system.

Muskegon has a population of 70,000.

■ ■

Walling Named Trustee for Utilities Power and Light

Willoughby G. Walling, president of the Personal Loan and Savings Bank, Chicago, has been appointed trustee for the Utilities Power and Light Corp., subject to a 15-day stay to allow attorneys for the company and a large majority of the security holders to appeal to the United States Circuit Court of Appeals.

Dwight H. Green, counsel for Utilities Power & Light Corp., has asked dismissal of the entire proceedings under which the company sought to reorganize. Hearing is set for October 6.

The corporation controls Laclede Gas Light Co., St. Louis, Mo.; Derby (Conn.) Gas & Electric Co.; Wallingford (Conn.) Gas Light Co.; Moncton Electricity & Gas Co., Moncton, N. B., Canada, and many other companies.

■ ■

So. Cal. Gas Co. Completes $85,000 Glendale Remodeling

The Glendale gas office, headquarters of Southern California Gas Co.'s northern division, has been undergoing extensive remodeling, at a cost of approximately $85,000. The work was to be completed and the office ready for opening on September 25.

An entirely new front, an enlarged lobby and customers' service facilities, model kitchen, summer and winter air conditioning and a gas-engine electric generating plant are included in the plans.

S. C. Singer is manager of the Northern Division.

■ ■

Rates Up in West Virginia

Increase in natural gas rates of Southeastern Gas and Water Co., in Danville and Madison, W. Va., and other sections of Boone County, has been ordered by the Public Service Commission. The new rates are: First 50,000 cu. ft. per month, 30 cents per M c.f. All over 50,000 cu. ft. per month, 25 cents per M c.f.

THE *Smilin' Thru* CAMPAIGN

Featuring

ROPER

GAS RANGES is a COMPLETE CAMPAIGN . . .

Ready for Your Use!

Complete Advertising and Sales Promotion Helps and Service yours for the asking . . . Let us show you

Tie in with the ROPER National Advertising Program

ROPER RANGES ARE IDEAL FOR USE WITH ANY TYPE OF GAS, INCLUDING BOTTLED GAS

GEO. D. ROPER CORP.

GENERAL OFFICES AND PLANT: ROCKFORD, ILL.

WAREHOUSES:

San Francisco · Los Angeles · Dallas · Kansas City · Chicago · Washington · Atlanta · Cleveland · Newark · Philadelphia

Gas Works Co. Advertising Features Smart Gas Homes

By ANTHONY HYDE

The Philadelphia Gas Works Company

THE trend to completely gas-equipped building operations has received notable stimulus in Philadelphia, Pa., where The Philadelphia Gas Works Co. has made rapid progress with its co-operative builders advertising program since early in the spring of 1937.

A. HYDE

What proved to be the spear-head of the drive, and opened up new avenues of acceptance for the all-gas convenience home, was the opening of the "Showplace of Modern Living" in the northern section of the city in May. This development consists of 40 homes of two sizes and prices, $5,950 and $7,250, and was built by John M. Zerbey.

Not only because it was the first project to be completely winter air-conditioned with gas in the Philadelphia area, but also because it offered this convenience plus modern gas cookery, automatic gas water heating, and refrigeration for less than $6,000, this operation has been regarded with unusual interest.

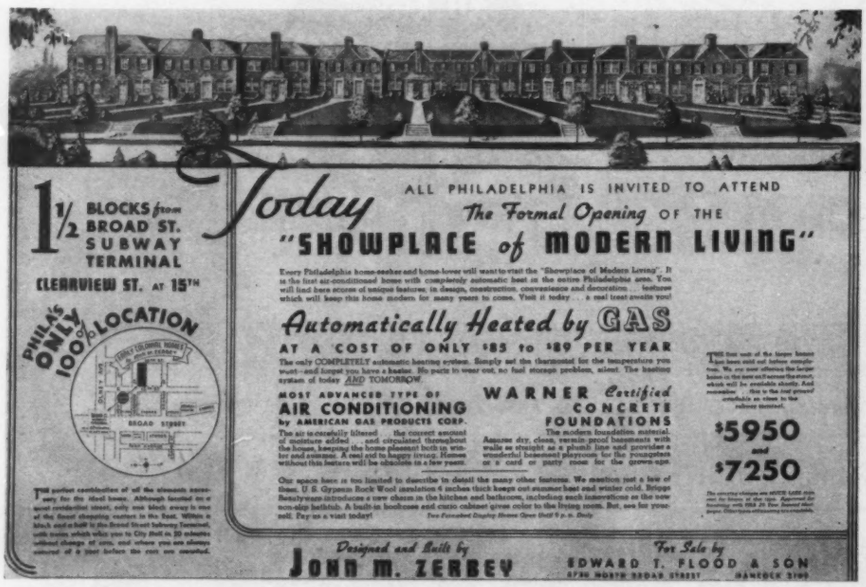
The estimated cost of heating these insulated homes with the new type American Gas Products winter air-conditioning system is only $85 to $89 per year. All modern features of design, construction, and decoration are embodied in these attractive brick houses. They front on 14-, 16-, and 19-foot widths.

Following large-space advertising of the "Showplace of Modern Living" in real estate sections of the Sunday newspapers, The Philadelphia Gas Works Co. launched a series of advertisements through the same media, in which groups of five projects were given prominent display.

The purpose of this campaign was three-fold: First, to sell the home-seeking public on the idea of choosing a home with modern gas appliances. Second, to direct the buying public to the particular developments of the builders who are featuring modern gas appliances. Third, to convince the public that gas appliances are the latest thing because they are used in new homes.

Builders in the past have been hesitant to install gas heat because they feared that it might retard sale of their houses. But this plan has a strong promotional effect on sales because it demonstrates to builders how they can actually sell their homes more readily by putting in gas appliances for the "Four Big Jobs."

Aggressive sales methods, coupled with a sound promotional and advertising plan, have helped The Philadelphia Gas Works Co. to offset and even to nullify the efforts of electric competition. Public reaction to the program has lived up to the highest expectations. Builders and home seekers alike, have shown increasing interest in gas convenience homes, which is a strong indication of their greater saleability.



The Philadelphia Gas Works advertisement featuring the "Showplace of Modern Living."

New Homes Exceed Population Gain First Time in 6 Years

For the first time in six years, new homes built in 310 leading American cities in 1936 exceeded the requirements of estimated population increase in those cities, according to E. E. Crabb, executive vice-president of Investors Syndicate, of Minneapolis. The cities included in the survey are located in 41 states and the District of Columbia, contain more than one-third of the country's population, and constitute an accurate index to the national home building situation, Mr. Crabb said.

Residential construction in these 310 cities last year provided housing for 491,608 people, or for 1.29 per cent more than the 483,757 estimated population gain in this group of cities during 1936, according to Mr. Crabb.

However, he states, a substantial housing deficit continues to exist in these cities, because for the six-year period, 1931 to 1936 inclusive, new residential construction was sufficient to take care of only 62.33 per cent of the estimated population gain. He pointed out that there must also be taken into account a further shortage created by destruction of homes by fire, flood and normal rate of obsolescence.

Tombstone and Benson Vote Bonds for Gas Lines

Voters of Tombstone and Benson, Ariz., on August 10 voted revenue bonds for municipal natural gas distribution systems. There were only two opposing votes in each community.

Tombstone has been granted outright PWA funds of $11,550, and Benson has been granted $14,650. Tentative loans of $14,120 for Tombstone and $17,890 for Benson, backed by the revenue bonds, will be given further consideration by PWA officials.

Portland Gets 35 Gas Homes

Four gas equipped homes, first of 35 to be built by Oregon Housing Corp., are on display in Portland, Ore. The first group of ten are being built to sell in the medium price bracket. Equipment includes gas ranges, gas refrigerators, gas water heaters, and gas heating plants.

ROBERTSHAW

Hand in Hand with the GAS INDUSTRY

Nowhere is the inspiring phrase of "United we Stand" more fully typified than in the Gas Industry.

Its members stride forward shoulder to shoulder — always contributing to the common welfare — constantly pulling towards the goal of perfection — constantly developing a greater industry.

In the field of appliance-accessories Robertshaw has played its part. Long experience, finely equipped laboratories, unceasing effort — all are at the service of the industry, contributing toward perfection in automatic heat regulation for cooking, baking, heating, industrial and miscellaneous commercial equipment.

Robertshaw salutes the members who gather at the nineteenth annual convention of the American Gas Association and pledges its continued endeavor to match accomplishment with accomplishment.

ROBERTSHAW THERMOSTAT COMPANY

YOUNGWOOD, PENNA.

★ WEDGEWOOD *Introduces* COMPLETE NEW LINE OF *Custom-Built* SEMI and HEAVY DUTY GAS RANGES

OVEN and BROILER MODEL 771-12

WITH **26** different cooking tops!

FASTER COOKING
•
20% MORE COOKING TOP AREA
•
FLEXIBLE CAPACITY
•
ECONOMICAL OPERATION
•
HIGH EFFICIENCY
•
UNIFORM HEAT DISTRIBUTION
•
FLEXIBLE HEAT CONTROL
•
GLASS WOOL INSULATION
•
STREAMLINED STYLING
•
RUGGED CONSTRUCTION
•
NEW CHROMIUM TRIM

MORE THAN MEETS PRESENT-DAY REQUIREMENTS FOR FAST, ECONOMICAL FLEXIBLE COMMERCIAL COOKING

Now, the chef can custom-build his own Wedgewood Heavy Duty Gas Range exactly to fit the needs of his kitchen—a tremendously important advantage in commercial cooking! Available in 26 different cooking top arrangements—26 different combinations of Griddles, Hot Tops, and Open Burners.

Another new feature which is of vital importance to any chef is Wedgewood's newly designed Cooking Top which has 20 per cent more cooking area for the same floor space used!

Experienced hotel and restaurant men say that these newest Wedgewoods are the *perfect* heavy duty ranges. They will stimulate immensely the sale of gas ranges to hotels, restaurants and institutions—an industry where competitive fuels are still extensively used—where fuel is consumed constantly night and day!

JAMES GRAHAM MANUFACTURING CO.
SAN FRANCISCO • LOS ANGELES • NEWARK, CALIF. • PORTLAND, ORE.
THE MODERN GAS RANGE MAKES FRIENDS FOR GAS

200 Gas Men Expected at Ames School, Nov. 10-13

AT least two hundred gas men are expected to attend the 17th annual Gas School and Conference at Iowa State College, Ames, Iowa, on November 10 to 13, according to L. W. Mahone, assistant professor. Among topics to be discussed will be "Detecting and Repairing Leaks"; "Effects of Changeover on Unacounted-for Gas;" "Practical Methods of Proving Meters"; "Repairing Meters"; "Trends of Gas Distribution Pressure Regulation"; "Basic Design of Instruments"; and "Electrolysis of Pipe Lines."

An extensive exhibit of metering and distribution equipment will be held in Engineering Exhibit Hall, where the general sessions will be held, making it convenient for those in attendance to examine the exhibits during the recess period.

The annual banquet will be held on November 11. C. I. Merick is in charge of entertainment.

Inquiries concerning the conference should be addressed to the Engineering Extension Service, Iowa State College, Ames, Iowa.

■ ■

United Fuel Gas Will Build 95-Mile High Pressure Line

Permission to construct a 95-mile high pressure gas pipe line, 20 and 16 in. in diameter, has been granted to United Fuel Gas Co., Charleston, W. Va., by the West Virginia Public Service Commission. The line will run from Cedarville, Gilmer County, to a point near Majorsville, Marshall County, near the Pennsylvania-West Virginia state line.

In its petition, United Fuel Gas Co. stated that it wished to construct the line in order to sell natural gas to The Manufacturers Light and Heat Co., Pittsburgh, Pa. United Fuel Gas Co. has a surplus of gas due to recent successful drilling operations in Kanasha County.

Permission was also granted to United Fuel Gas Co. to construct a compressor station three miles east of Glenville, Gilmer County.

■ ■

Gas Range Production in 1936 Highest Since 1930 Peak

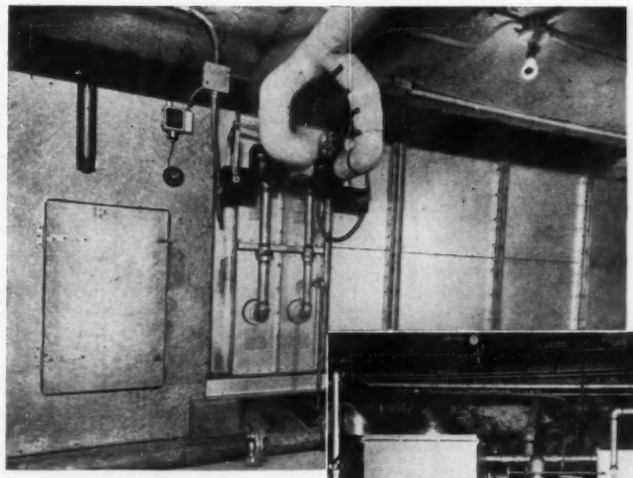
Production of gas ranges in 1936 was the best since 1930, reaching a total of 1,484,100 units, or 84,000 units more than were manufactured in 1930, according to a bulletin, "Comparative Data on Gas Ranges," just issued by the statistical department of the Association of Gas Appliances and Equipment Manufacturers. The bulletin covers the years 1930-36.

Shipment of ranges was likewise greater in 1936 than during any other year since 1930. Total shipments for 1936 numbered 1,463,900; for 1930 they were 1,375,000.

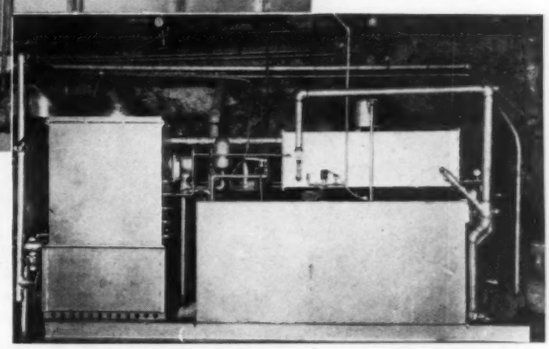
■ ■

New Office in Liberty, Mo.

Central West Utility Co. has moved its offices in Liberty, Mo., into a new building, which is air conditioned, and lighted by both gas and electricity.



Air heaters and lithium chloride contactor in the Cory Hill Hospital air conditioning installation.



Lithium chloride sump tank, concentrator condenser and supply tank.

Brookline, Mass., Hospital Installs Gas-fired Air Conditioning Unit

BROOKLINE, MASS., claims the first completely air-conditioned hospital in the world. It is Corey Hill Hospital, for which Surface Combustion's gas-fired Kathabar air-conditioning equipment has been selected.

Using a liquid absorbent known as Kathene, Kathabar dehumidifies the air in summer, humidifies it in winter.

Since air recirculation is not desirable in hospitals, all air on the installation is brought in from the outside, conditioned, and then supplied to the rooms through ducts. When summer conditions are extreme, incoming air of a temperature of approximately 30° below desired room temperature is required to obtain the heat balance between the air volume and sensible heat gains.

To introduce this abnormally cold air into rooms without drafts, each room is provided with its own recirculating unit. This unit is equipped with a primary air outlet approximately 30 in. long by ½ in. wide. Cold air enters through this slot from the central conditioning plant. The air velocity through the slot is such that 100 cu. ft. of incoming cold air will inspirate 130 cu. ft. of the warmer room air. The resultant 230 cu. ft. of mixed air leaves the grille of the unit only 13° below normal room temperature.

Incorporated in these room units are fin type heaters, under control of self-contained steam valves, to maintain proper room temperature during winter operation. Gravity exhausts in patients' rooms and fan exhausts in the operating rooms prevent general recirculation of the air.

Under extreme summer operating conditions, 60 per cent of the total work is accomplished by Kathabar absorption in the Corey Hill Hospital air-conditioning installation. As only 38 cu. ft. per hour of 540 B.t.u. gas and 2.5 gallons per minute of city water per ton of refrigeration developed, a saving of approximately 20 per cent over mechanical refrigeration is indicated. The air-conditioning system for Corey Hill was installed by Cooling and Air Conditioning Corp., Boston, Mass.

■ ■

New A.G.A Ad Theme Stresses Heat Control

Theme of the first advertising during the second year of the A. G. A. national promotion for the gas industry is: "I can 'Tune In' any temperature on my new gas range." This caption is appearing in certain magazine advertisements, in newspapers, on billboards, and is available also in poster sizes especially suitable for trucks and cars.

During the second year, advertisements will appear in ten national magazines, five trade magazines, and three home economics publications.

Doctoring OLD Pipe for the NEW Fitts Line

CITIES Service Gas Co. worked out an efficient and money-saving method for salvaging and reconditioning pipe for its new 47-mile 12- and 16-inch line running from the south end of the Seminole line to the Carter Co.'s gasoline plant in the Fitts Field. The pictures illustrate various steps in the process.

No. 1 shows the pipe, which has been lifted out of the ground by Caterpillar, being parted into joints, and the coupling bolts being cut off with acetylene torch. The salvaged pipe was trucked to Ada, Okla. No. 2 shows a general view of the yards there. No. 3 is a close-up of the motor-powered pipe cleaning machine. In No. 4, the beveling machine is cutting angle at ends of pipe, preliminary to welding. No. 5 shows a crew making preliminary welds, preparatory to finishing the repair job by filling pin-holes and other slight flaws. No. 6—completion of the reconditioning operation. Workmen are welding two 20-foot lengths, ready to be hauled to the field. Time and expense were saved by doing this work in the yards.

Arkansas-Louisiana Moves Compressor Station

Arkansas-Louisiana Gas Co. is salvaging the equipment from its Springhill (La.) compressor station and is moving it to a new compressor station site located about 7½ miles south of Daingerfield, Texas. This involves the moving and reinstallation of six 170 hp. units.

The new compressor station is on the company's East Texas 8- and 10-inch line which runs from the Roger compressor station at Lewis, La., to the Talco Field in Texas. Addition of this capacity to the line is primarily to serve consumers in the Talco Field.

■ ■

Chicago Power Exposition Draws 125 Exhibitors

With 125 exhibitors signed up a month before the doors are to open on October 4, the Chicago Exposition of Power and Mechanical Engineering promises to be a unique market place in which industrial engineers and executives may view the latest mechanical equipment, according to officials in charge.

Products shown will include control equipment, piping and tool equipment, generating equipment, air conditioning and refrigerating apparatus, machines, transmission apparatus, materials handling, metals and alloys, refractories, and electrical apparatus.

Technical society meetings are scheduled to be held during the week of the Exposition, which closes October 9.

Admission will be by invitation and registration only. No admission fee will be charged.

■ ■

West Texas Gas Co. Shifts Local Managers

Recent changes in the West Texas Gas Co., Lubbock, Texas, have been reported as follows:

Frank Wright, who has been manager at Post for two years, has been placed in charge of the company's warehouse at Lubbock. Jim Smith, who has been at Slaton for four years, succeeds Mr. Wright.

Orby Wilks, manager at Crosbyton, has been transferred to Canyon as manager. T. S. Furlow of Canyon will take charge of the office at Crosbyton.

Roy Leslie, formerly manager at Tahoka, has been made manager at Quitaque. C. M. Walden of Quitaque succeeds Mr. Leslie at Tahoka.

Three Pennsylvania Hearing Dates Are Changed

Hearings on natural gas rates scheduled by the Pennsylvania Public Utility Commission for September 15, 16, and 17 at Pittsburgh, have been postponed to September 29 and 30 and October 1, according to announcement by the Commission. The new schedule is as follows:

September 29: Equitable Gas Co.; Duquesne Natural Gas Co.; Ambridge Gas Co.

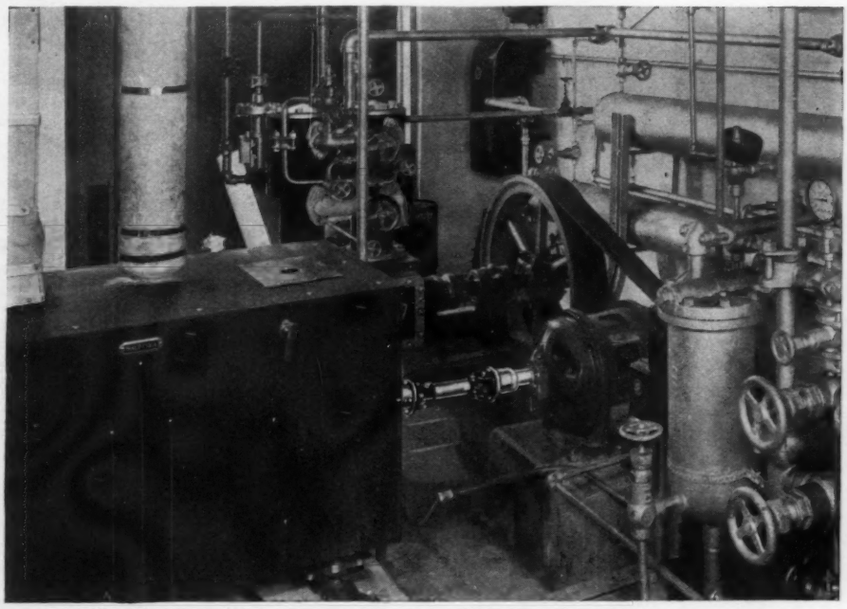
September 30: Manufacturers Light & Heat Co.; Union Heat and Light Co.; Manufacturers Gas Co.

October 1: Peoples Natural Gas Co.; T. W. Phillips Gas & Oil Co.; Acme Natural Gas Co.; Beaver-Butler Gas Co.

■ ■

Missouri-Kansas Pipe Line Co. Names Maguire President

W. G. Maguire was named president of the Missouri-Kansas Pipe Line Co. at a meeting held in August by order of Chancellor Josiah O. Wolcott. Other officers are A.F. Dixon and H. P. Childs, vice-presidents; H. L. Tower, treasurer; and William Tringham, secretary. Mr. Maguire, Mr. Dixon, and Jeoffrey R. Mellor were named to the executive committee. The directors voted, 5 to 2, to continue the company instead of liquidating it.



In the Goon Ice Cream Company plant, Toledo, Ohio, a 15 hp. Waukesha FCDU Deluxe Automatic Gas Engine is direct connected to an induction motor shaft extension which is belted to a 5-ton ammonia compressor—a triple combination of engine, induction motor, and mechanical load.

YEAR-ROUND LOAD BUILDING

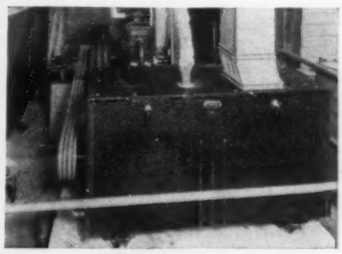
with Waukesha Automatic Gas Engines

• How can your gas company build a substantial, profitable, year-round gas power load? R. S. Wenner of the Northwestern Ohio Natural Gas Company has the answer. He tells how a Waukesha Gas Power Unit saves $48.84 a month in the plant of the Goon Ice Cream Company, Toledo, Ohio, shown above. His interesting story, with complete details, diagrams, test data, etc., appeared in the August issue of "Waukesha Engineering Record." A copy will be mailed you on request.

Mr. Wenner says, "We were greatly interested and impressed with the Waukesha Automatic Deluxe Power Unit. It revived our dying interest in gas power as an adjunct for load building."

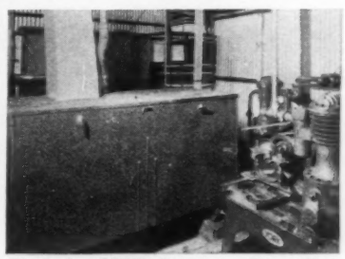
Waukesha Automatic Power Units are built in three sizes . . . 10 hp. to 67 hp. . . . in the Deluxe sound-silenced cushion-mounted design. Waukesha Standard Stationary Engines for gas, up to 350 hp. Write for Bulletin 1048.

MEET US AT THE HOLLENDEN HOTEL, SUITE 332-333X, in CLEVELAND, WHEN YOU ATTEND THE A. G. A. CONVENTION

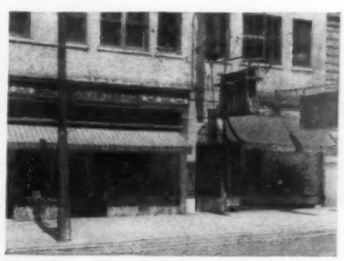


Waukesha FCDU Automatic Power Unit drives two 4 x 4 Twin Cylinder York Compressors and cooling fan, Ewing Bros., jewelers, Atlanta, Georgia.

Interior view of plant of Ewing Bros., manufacturing jewelers, Atlanta, Georgia, space air conditioned by Waukesha power.



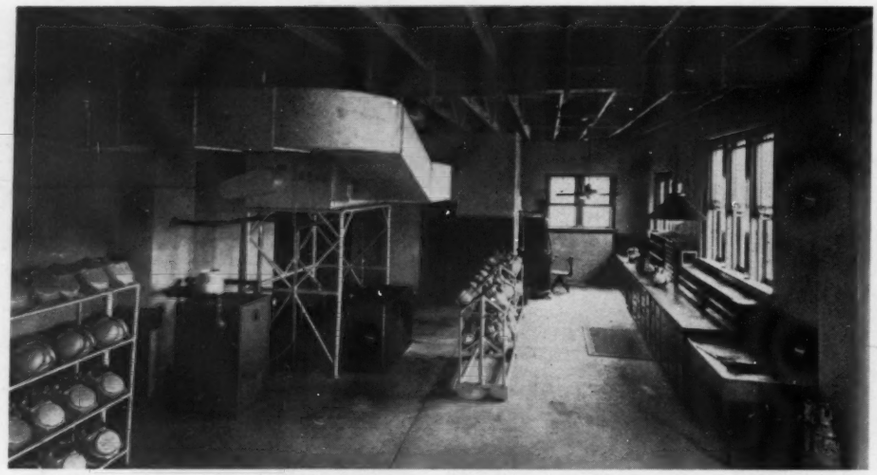
Waukesha FCDU Automatic Power Unit drives three 4 x 4 Twin Cylinder York Compressors and 2-hp. Trane Cooling Unit on the roof penthouse of the Wisteria Gardens in Atlanta, Georgia.



Exterior view of building occupied by Wisteria Gardens, Atlanta, Georgia, also space air conditioned by Waukesha power.

GAS POWER DIVISION

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN



Meter shop of Southwest Natural Gas Co. at Ada, Okla.

Southwest Natural's New Office at Ada Air Conditioned All Year

MANY factors make the new building of the Southwest Natural Gas Co., Ada, Okla., outstanding, according to C. A. Breitung, manager at Ada. Year-round air conditioning and flood lighting with natural gas are featured. Although the outside dimensions are only 60 ft. by 70 ft., ample space is provided for the division offices and meter repair shop for this district, which serves 7,000 consumers in eight towns.

The front of this Spanish style building is finished in white stucco. The roof is of red tile.

The two vestibules placed just inside the entrances serve two purposes: One to provide the double doors required for economical summer air conditioning, and the other to provide a space for the display of appliances. Further influence of the air conditioning on the building design may be found in the Celotex ceiling covered with four inches of rock wool insulation, and the Airlite combination lighting and also in the conditioned air inlet fixtures.

Air conditioning is supplied by a Trane unit that contains the filter, heating radiator, cooling coils, humidifying unit and circulating fans. A Waukesha Natural Gas Ice Machine, equipped with an evaporative condenser is used to handle the refrigerant for cooling. Steam for heating is supplied by a Bryant natural gas fired boiler. The shop, which is not air conditioned, is heated with fan type circulating heaters suspended from the ceiling.

Two Humphrey 3,000 candle power natural gas flood lights illuminate the exterior of the building.

Special attention has been given the meter shop floor plan. The arrangement used was decided upon by the shop employees after visiting the meter shops of the leading gas companies in the Mid-continent. It allows the work to be carried out efficiently and makes for a minimum amount of confusion.

■ ■

Federal Housing Project Buys From Oklahoma Natural

Will Rogers Court, federal low-cost housing project in Oklahoma City, Okla., will buy its gas from Oklahoma Natural Gas Co., according to a contract awarded at Washington, D. C. The project will take about 40,000,000 cu. ft. of gas annually, according to an announcement to the press by Thomas H. Sterling, district manager. The company expects to construct a building for its measuring and reducing equipment.

The company, it is said, will sell all the gas to the Government through one meter at its regular industrial rate. Cost of the gas will be pro-rated among the apartments and will be a part of the rent. There will be no individual meters in the apartments.

There will be five heating plants and most of the gas will be used for their operation.

■ ■

Lordsburg Moves Near Goal

A municipal distribution system for natural gas in Lordsburg, N. M., moved nearer actuality with authorization of the statement by W. C. Powell, state engineer for the Public Works Administration, that bids would be advertised for the construction work.

A. G. A. Exhibit Planned For National Metal Show

DOMINATING feature of this year's National Metal Exposition will possibly be the combined industrial gas exhibit under the auspices of the Industrial Gas Section of the American Gas Association, in co-operation with a number of gas companies and equipment manufacturers. The Exposition will be held in the Auditorium, Atlantic City, N. J., during the week of October 22.

The combined industrial gas exhibit will be participated in by 12 manufacturers of industrial gas equipment who will display new and standard metallurgical apparatus for both manufactured and natural gas. Most of these exhibitors will have gas furnaces and burners lighted and going full blast. Many new pieces of equipment, controls, etc., will be shown. Prominent gas engineers and executives will be available at all times to answer questions.

At the four corners of two intersecting aisles will be the circular booth of the American Gas Association and this will be surrounded on four sides by booths of the gas equipment manufacturers.

The layout of the gas exhibit has been prepared by the Committee on Displays at National Industrial Expositions, of the Industrial Gas Section of the American Gas Association, of which Harry A. Sutton, Public Service Electric & Gas Co., Newark, N. J., is chairman.

■ ■

Consolidated Gas Utilities Buys Home Natural

Sale of Home Natural Gas Co., Winfield, Kan., to Consolidated Gas Utilities Corp., was made known recently when Consolidated filed an application with the State Corporation Commission of Kansas for a certificate of convenience and necessity to furnish natural gas to Winfield at the city gates. Winfield has a municipal distribution system.

Consolidated Gas Utilities Corp. serves industrial and commercial gas to several Kansas and Oklahoma towns. It has pipe line connections with gas fields in Texas.

Consolidated has agreed to retain all the Home Natural gathering lines and take all local gas as far as is practical. Home Natural was managed by General Management Corp.

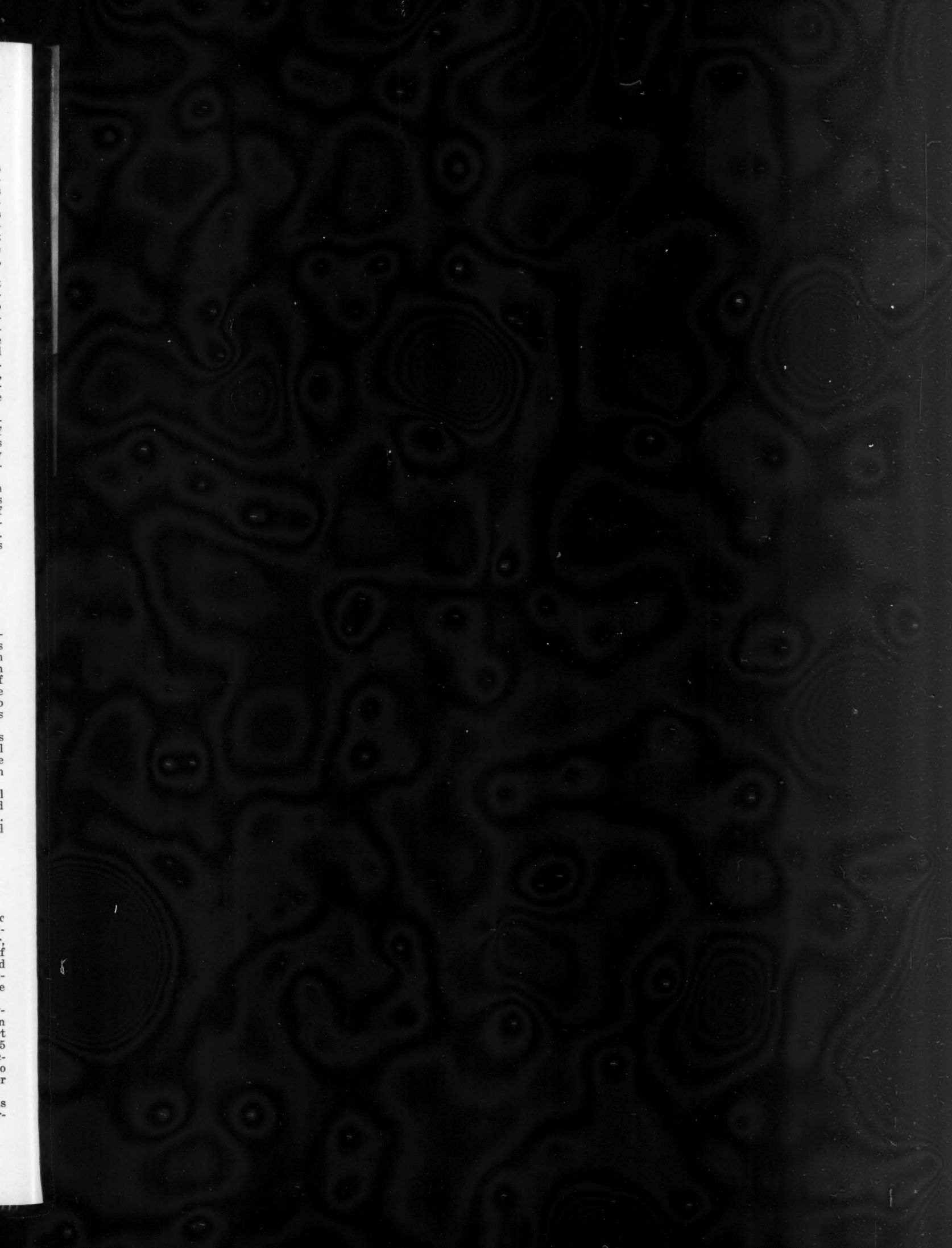
■ ■

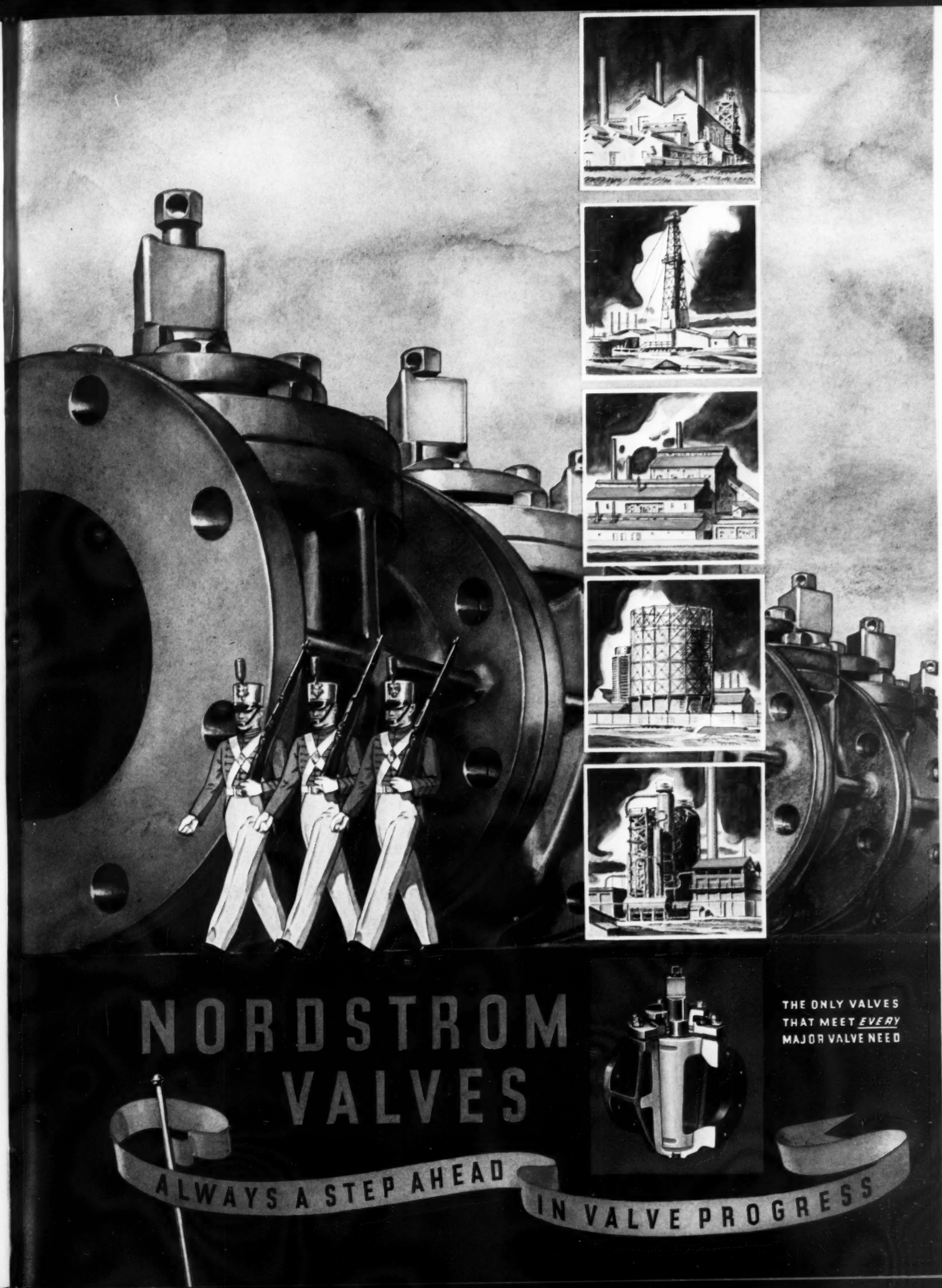
Survey Shows Gas Cheapest Fuel in Portland Area

Gas is the cheapest fully automatic fuel available in Portland, Ore., according to the findings of J. Donald Kroeker, consulting engineer and a member of the American Society of Heating and Ventilating Engineers, who has just released a study entitled "Comparative Fuel Costs in the Portland Area."

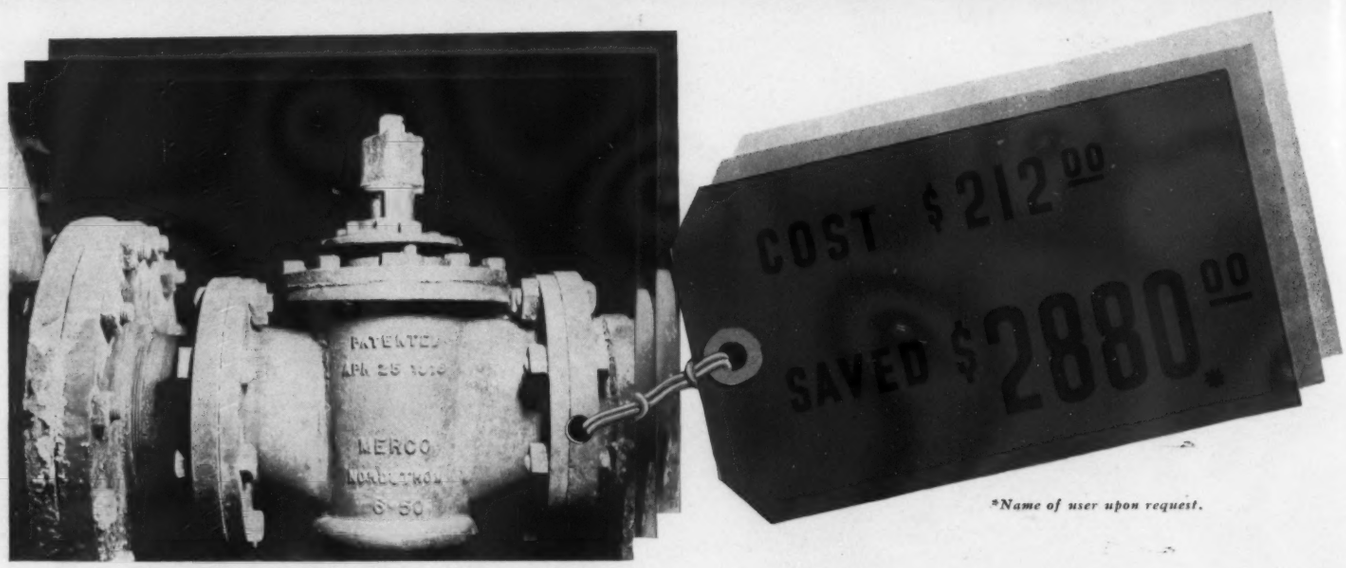
In a five-room house, gas for all service is 36 per cent cheaper than oil in combination with electricity, the report shows, and gas for all services is 13.5 per cent cheaper than wood and electricity. Statistics are presented also that show gas to be cheapest for water heating, cooking, and refrigeration.

The Portland Gas & Coke Co. has sent out copies of the report with personal letters of transmittal.




NORDSTROM
VALVES
THE ONLY VALVES
THAT MEET EVERY
MAJOR VALVE NEED
ALWAYS A STEP AHEAD
IN VALVE PROGRESS

THE PERFECT APPLICATION OF A PRINCIPLE



*Name of user upon request.

"Three Nordstrom Valves have saved them $8640.00"

EIGHT YEARS ago a certain prominent oil company was purchasing ordinary 4" brass cock valves for $90.00 each. The service for which these valves were used was on sludge acid draw-off or lubricating oil agitator lines—a severe service. The valves lasted only about 90 days; then had to be renewed. *Quite expensive valve service.* A Nordstrom field engineer appeared on the scene. After studying the problem he suggested Nordstrom Mercoloy Valves. His recommendation was followed. Since installation, these three Nordstrom Valves have been in constant service without repair or replacement and have already given thirty-two times more service than the original valves, at a saving to the oil company of $2880.00 per valve. The total saving is $8640.00, to date.

True, the price of Nordstrom Valves in this instance was more than for ordinary valves but the difference in cost is less than 4% of the savings to date—so it isn't the price tag on a valve that counts, but the *service* that's rendered.

In the *gas* industry we can show you countless instances where the cost of Nordstrom Valves is repaid again and again by the service that follows for years to come. Nordstrom Valves, in certain sizes, particularly those with face-to-face dimensions, same as gate valves, are competitive in price.

MERCO NORDSTROM VALVE CO. *A Subsidiary of* **PITTSBURGH EQUITABLE METER CO.**

Main Offices: Pittsburgh, Pa. *Branch Offices:* New York City, Buffalo, Philadelphia, Columbia, Memphis, Atlanta, Chicago, Kansas City, Tulsa, Houston, Los Angeles, Oakland. *Canadian Representatives and Licensees:* Peacock Brothers, Ltd., University Tower Building, Montreal, Quebec.

NORDSTROM VALVES

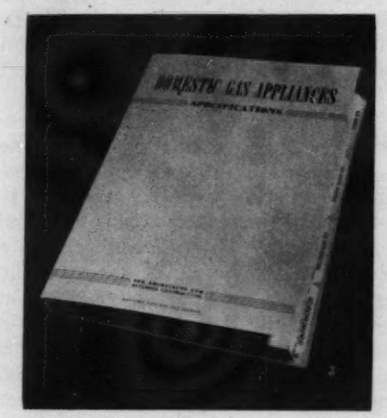
LUBRICATED PLUG

PATENTED "SEALOPORT" LUBRICATION

Houston Natural Compiles Builders' Appliance Book

AS part of its program of keeping architects and home builders informed on modern gas appliances, the Houston Natural Gas System has compiled what might be called a consolidated catalog of gas equipment available for the home.

This catalog, which consists of 473 pages, is divided into four sections: Gas Ranges, Gas Water Heaters, Gas Refrigeration, Gas Heating Equipment. Each section contains illustrated and descriptive information on



all the better types of A.G.A. approved appliances and equipment offered by the leading manufacturers of the country.

Some 41 manufacturers co-operated with the Houston Natural Gas System in compiling the book by furnishing the descriptive literature of their lines.

Practically all gas appliance and equipment manufacturers regularly publish standard size (8½" x 11") catalogs or catalog pages on their products; hence little expense was incurred by these manufacturers since they had only to furnish extra copies of literature they had on hand.

Copies of this consolidated catalog have been presented to every architect and every building contractor in the area served by the Houston Natural Gas Co. This gives these men, in one handy volume, what amounts to an encyclopedia of gas equipment for the modern home.

Request for additional copies and even offers to purchase extra copies have been received.

■ ■

Bring in Big W. Va. Well

A natural gas well with an estimated capacity of 30,000,000 cu. ft. a day has been brought in on Grapevine creek near Charleston, W. Va. It is said to be one of the largest ever drilled in the state. It is owned by the Hayes Oil and Gas Co., J. W. Parris and others.

P. C. G. A. Section Chairmen Named And Committee Heads Announced

SECTION chairmen of the Pacific Coast Gas Association have been appointed for 1937-38 by President Norman R. McKee, and most of these chairmen in turn have appointed committee chairmen. A number of the latter have completed their subcommittee organizations. Sections, committees, subcommittees, and their chairmen are as follows:

Accounting Section: H. E. Davidson, Southern California Gas Co., chairman.

Sales and Advertising Section: Norbert O. Fratt, Seattle Gas Co., chairman.

Home Service Committee: Ruth D. Kruger, Central Arizona Light and Power Co., chairman.

Technical Section: A. B. Allyne, Southern Counties Gas Co., chairman.

Distribution Committee: H. G. Laub, Southern California Gas Co., chairman. Under the Distribution Committee the following sub-committees were appointed:

1. *Special Problems Subcommittee:* Frank Wills, Pacific Gas and Electric Co., chairman.
2. *Pressure Piping Code Subcommittee:* D. H. Perkins, San Diego Consolidated Gas & Electric Co., chairman.
3. *Measurement and Regulation Subcommittee:* H. A. Faull, Southern Counties Gas Co., chairman.
4. *Service Men's Training Subcommittee:* B. F. Embry, Southern California Gas Co., chairman.
5. *Construction and Maintenance Subcommittee:* C. P. DeJonge, San Diego Consolidated Gas & Electric Co., chairman.
6. *Leakage Subcommittee:* W. F. Pape, Pacific Gas and Electric Co., chairman.

Production Committee: J. E. Kelley, Pacific Gas and Electric Co., chairman. Subcommittee appointments will be announced later by Mr. Kelley.

Transmission Committee: F. E. Wilson, Pacific Gas and Electric Co., chairman. Under the Transmission Committee the following subcommittees were appointed:

1. *Large Volume Measurement Subcommittee:* G. B. Reece, Southern Counties Gas Co., chairman.
2. *Pipe Protection Subcommittee:* C. F. Briscoe, Southern California Gas Co., chairman.
3. *Compressor Plant Subcommittee:* A. B. Newby, Southern California Gas Co., chairman.
4. *Pipe Lines Subcommittee:* R. T. Peterson, Pacific Gas and Electric Co., chairman.

Utilization Committee: R. I. Snyder, Southern California Gas Co., chairman. Under the Utilization Committee the following subcommittees were appointed:

1. *Architects and Builders Service Subcommittee:* Frank Moon, Southern California Gas Co., chairman.
2. *Appliance Laboratories Subcommittee:* J. P. Dresen, Public Service Co. of Colorado, chairman.
3. *Utilization Data Sheets Subcommittee:* E. L. Kells, Southern Counties Gas Co., chairman.
4. *Standardization of Appliance Installation Procedure Subcommittee:* C. R. Miller, Portland Gas and Coke Co., chairman.
5. *Field Inspection of New Appliances Subcommittee:* J. P. Humble, Southern California Gas Co., chairman.

Co-operative Advertising Committee: A. C. Joy, Pacific Gas and Electric Co., chairman.

Educational Committee: A. J. Noia, Pacific Gas and Electric Co., chairman.

Women's Committee: Doris Allen, Southern California Gas Co., chairman.

■ ■

F. I. Thompson, American Meter Co., Dies Suddenly

After only a short illness F. I. ("Tommy") Thompson, sales engineer for American Meter Co., Inc., died August 10 at Westbrook, Conn., age 41.

"Tommy" Thompson entered the University of Pennsylvania in September, 1914. He did not complete his course, but enlisted in an American Ambulance Corps which was sent to France and first attached to the French Army, then later transferred to the American Army in France. He was cited by General Petain of the French Army for his splendid work. At one time Thompson drove an ambulance for 92 hours without relief.

On his return from France in 1919 he went to Tulsa, Okla., and joined the Tidal Refining Co. For several years he did test-car work and general field testing in connection with gasoline plants. He was later placed in charge of the large Glen Pool gasoline plants of the Tidal Oil Co. from which position he resigned in 1923 to joint Westcott & Greis, Inc., which is now a branch of the American Meter Company, as sales engineer. He was transferred to Chicago in 1933.

■ ■

Foundations Set for $40,000 Southern Counties Holder

Work on a new $40,000 high pressure holder at Claremont, Calif., was commenced September 15, Southern Counties Gas Co. engineers announce. With the site already acquired and the foundation in, it is expected that the steel work will be completed by the first of November.

This is one of four similar holders that Southern Counties Gas Co. expects to build in the next few months.

■ ■

Enid to Vote on Franchise

A 25-year franchise for Oklahoma Natural Gas Co. was to be voted on in Enid, Okla., on September 21. The company's present franchise expires in 1941.

SALES SLANTS

A month by month presentation of experiences on the sales front.

Read Industry Advertising Over Mrs. X's Shoulder

IT WOULD doubtless be an interesting revelation to a dealer if he were permitted to observe Mrs. X during those hours she spent reading. He would probably see for the first time just how important his advertisements are to Mrs. X and to himself, or, on the other hand, just how great an obstacle he puts in Mrs. X's buying pathway by not advertising.

Mrs. X is a typical housewife. For entertainment, her reading library will be largely made up of women's current magazines. But the love and adventure stories in the magazines are by no means all that she enjoys reading. She is interested also in the latest news regarding products that add to the convenience of her home, to the comfort and health of her family and to the thrift of her pocketbook.

Never doubt for a moment that she does not absorb with a great deal of interest almost all that is written about modern kitchens, vitamin cooking, advanced refrigeration methods, cleanliness that hot water promotes and the enjoyment of a healthfully heated home.

Occasionally you will see Mrs. X tear a coupon from the magazine. She is sending it to the advertiser for booklets telling more about this or that product which she will read avidly.

Her daily newspaper is a source of more current, up-to-the-minute information. As you observe Mrs. X scanning its columns, it will perhaps surprise you to learn that her apparent interest in war-torn Spain, the launching of the great Clipper plane, the new world's heavy-weight champion is only casual. But you will see her read the advertisements with a purpose—advertisements about things close to her everyday life, such as the price of ham, the gas company's or manufacturer's ads about beauty and convenience of the modern gas range and the like.

All the information Mrs. X is getting about ways to thrift, comfort, economy, convenience, and health are creating impressions in her mind which are moving her over the buying pathway to a definite buying decision.

That decision can either be blocked or stimulated—and the local dealer holds the key. For Mrs. X to learn about the advantages of gas appliances from the national magazines and from the manufacturer's or gas company's advertisements in her local newspaper are not enough. She must know exactly where to go to buy them, she must be told that it is easy for her to own them, and that now is the time to look them over.

Without this information and encouragement from you, the dealer, there is a washed-out bridge in Mrs. X's buying pathway. She will sometimes jump that gap, but that bridge is needed for a lot of Mrs. Xes who are your customers.

Provide it for them! Advertise and the Mrs. Xes will repay you by buying at your store.

■ ■

Consolidated Edison Drive

A campaign for the retail sale of Electrolux gas refrigerators was started on September 1 by Consolidated Edison Co. of New York, according to E. F. Jeffe, vice-president in charge of sales. The drive will be based on the lowest prices for the various gas refrigerator models ever offered by the manufacturer. The refrigerators may be purchased on deferred payments to run for a period of from 37 months to four years, and there will be no stipulated down payment. Neither will there be a minimum monthly payment. Any dealer approved by Consolidated Edison Co. will be eligible to operate under this plan.

Talking Golf, Fish, or Science Does Not Sell Gas Appliance

"TO watch some sales interviews, you would think that their purpose was anything but to get an order," said a gas appliance salesman of our acquaintance. "I recall from my own early experience how difficult it was to keep the discussion free of conversation about golf, house-cleaning, fishing and a thousand other things that tend to creep into a sales interview.

"Digressions are seldom deliberate or abrupt. They simply slip into the discussion before you know it. That's why a salesman must always be on guard to keep out those things that will not help a sale.

"For instance, I recall an interview where I was telling about the heavy insulation of the modern gas range and the prospect wanted to know what the insulating material was made of. This, of course, was a relevant question and deserved an answer. But this particular prospect seemed to be keenly interested in manufacturing processes and it was an easy jump from what the material was to how it was made. Another slight jump, and we were on the subject of wallboard manufacture and soon we were discussing the relative merits of fabric manufacture and the interview went 'blooey.'

"The point is that digressions usually begin harmlessly enough. In fact, from a related issue. When the related issue happens to be close to a subject in which the prospect is keenly interested, it is only natural that he carry the discussion in that direction.

"Unless the salesman 'takes the bull by the horns,' his chances of getting the action wanted are gone. It takes time to get the knack of dominating an interview and pulling the discussion back to the main subject, but a salesman will never get far until he masters it.

"In the instance above, that interview should never have grown away from me. It would have been simple enough for me to have pointed out that manufacturing processes were important not only in the matter of insulation but in burners of the modern gas range, and, because of her interest in the construction of things, she would doubtless appreciate what the burner could mean to her. Thus, we should have been back to the subject and the interview would have been saved.

"Of course, it is not always that a digression will go so far afield as

fishing, golfing, or the manufacture of fabrics. Dwelling too much on little side issues, although relevant, can be just as fatal as a complete digression. The trick is to never let the prospect get you away from the main thread of the sales story, or if she does, pull her back quickly and tactfully. And above all, never digress from the sales story yourself."

■ ■

"Comfort Cruise" is Current Mississippi Power Campaign

Mississippi Power & Light Co., Jackson, Miss., has launched a heating campaign called the "Comfort Cruise" under the slogan, "Cruise to Comfort in 1937 with automatic natural gas heat." The company is developing the appeal that the balmy weather and comfort of the tropics is available even to those whose pocketbooks won't permit them to sail to sunny waters during the winter.

Four all-expense cruises to the Caribbean Sea are offered as prizes. Three will go to dealers and one to a sales captain. Names of all dealers in the three highest districts who earn more than 200 points will be placed in a hat and the winners will be drawn from it. The sales captain who wins first place will also win a trip.

The Mississippi Power & Light Co. will run free service lines up to 100 feet for any new customer secured by dealers or company during the campaign.

An extensive newspaper campaign is being carried on, and a 15-minute radio program is broadcast over WJDX each Wednesday evening at 9.45. The drive ends November 15.

■ ■

Three-Year House-Heat Costs Used in Peoples Gas Ads

Gas house-heating costs, compiled from actual cases extending over a period of three years, form the basis for the new advertising campaign of The Peoples Gas Light and Coke Co., Chicago, Ill. Costs in fifty cases of three-year users are cited in one piece of advertising called, "Let's Get Down to Cases." Other folders, all of which are illustrated, are entitled, "Let Sweeney Tell You," "How Are You Firing?" and "Have You Heard About the Joneses?"

The cost campaign is carried out also on billboards and painted signs. These show "Mister Zip," trade character devised by the advertising department for outdoor posters, holding up three fingers to express his satisfaction with three years of gas heat.

■ ■

Union Light at Food Show

A cooking school, a display of gas heating units, and a puppet show made up the triple bill presented by Union Light, Heat & Power Co., Cincinnati, Ohio, during the Food Show held at the Zoo. Mrs. Mary Belle Burnett, home service head, directed the cooking school, which was conducted under the auspices of the Cincinnati *Times-Star*. Bernard H. Paul's puppets appeared in a two-act playlet showing why gas is the ideal home-heating fuel.

Pay "Then" Means Sell "Now"

WHAT percentage of a family's income can be appropriated for the purchase of gas appliances?

If people were required to pay cash for their modern gas range, automatic gas water heater, or gas refrigerator, your market would be limited, indeed.

Let us take as an example Family X whose annual income is $1800. The U. S. Department of Labor, according to surveys for the years 1933 to 1935, says that 77 per cent of the average family's income will be spent for the first essentials to life—food, clothing, a place to live, and medicine. Thus, in any given year, a balance of $414 will be left to Family X for the purchase of other things.

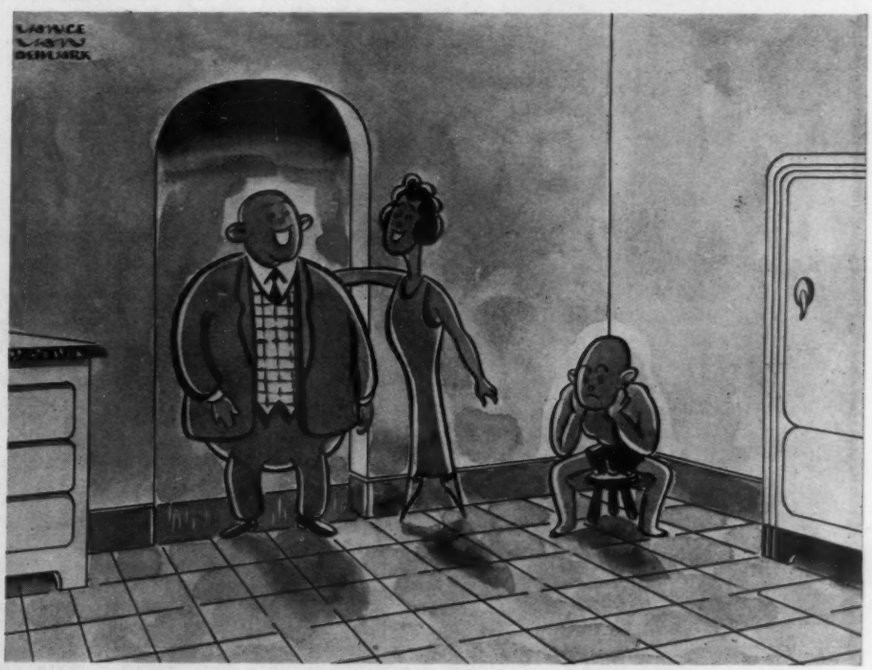
Even though you were the best salesman who ever lived, you would not be able to get all of that $414 in any one year. You would find that much of it had already been appropriated (even for years ahead) for other things — insurance premiums, an automobile, stocks and bonds, or the building of a savings account, furniture, and many other things. You will be doing a good selling job to get as much as $90 of it in a year.

Perhaps Family X could afford an automatic gas water heater on 12-month terms or even for cash, but it is obvious that the purchase of a modern gas range or gas refrigerator or both or all three gas appliances must be financed on much longer terms. For instance, Family X would need three years to pay out a $270 bill of goods and four years to pay out a $360 bill.

Family X is fairly typical in the sense that families with about $1800 incomes represent a sizable portion of your gas appliance market. And the situation remains relative with families of income up to $2400 a year and these two groups will surely represent 75 per cent or more of the market.

To get volume, therefore, long terms, consistent with good business, are necessary. Those merchants who have recently extended their terms to longer periods or who are now contemplating such a move will find ample evidence of the soundness of installment selling in the records. As one example of its soundness, out of 500 sales financing companies in the United States during depression years, all but 5 survived and are thriving concerns today.

LITTLE NAT **By Vance Van Demark**



"He can't understand why the United States has only one vice-president and the A. G. A. has eight!"

Water Heater Sales Up 45% In Illinois Iowa Power Drive

A 45 per cent increase in the sale of storage-type automatic gas water heaters has resulted for the Illinois Iowa Power Co., Champaign, Ill., during a campaign that began April 1 and still continues. The pick-up over last year's sales for the corresponding period is in the face of active selling of ranges and refrigerators.

The utility is using a trial-purchase plan, whereby the company will install for a four-months' trial period a Model 2-20 Ruud DeSota storage type gas water heater with a capacity of 20 gallons. If the user does not wish to complete purchase, the only cost to him is the down payment and the three monthly installments of the trial period.

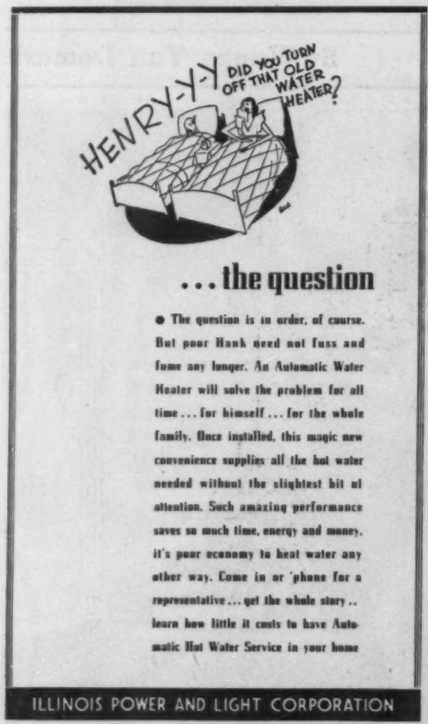
The newspaper advertising, prepared by William H. Matlack, advertising manager, is aimed to sell "What hot water service will do for you." A series of single-column ads showing at the top of each a faucet from which hot water is steaming, carries such titles as "Junior Won't Mind" (a Saturday night bath), "Choose Your Own Time for Bathing"; "A Beauty Treatment — It Takes Hot Water"; "H_2O, But It Must Be Hot" (for shaving); "Hair that Gleams" (shampooing). Each advertisement is illustrated with a small line drawing.

A series of larger ads uses humorous drawings to illustrate copy headed: "Test with Your Toe, Fair Lady"; "Sir, You're a Scoundrel!"; "Are You a Climber?"; "Henry-y-y! Did You Turn Off That Old Water Heater?"

A particularly catchy title was "The New Whispering Campaign." This advertisement continued: "Somewhere right in your neighborhood—among your friends there are many who will tell you it's a fallacy to live in a house, this day and age, without Automatic Hot Water Service." This ad and several others used the slogan, "Go Gas for Hot Water!"

Another effective ad, using one-fourth page, carried at the sides of a picture of a pretty girl, these captions: "A Wreck (after a crowded day) at 6 p.m." "The Life of the Party at 10 p.m." Underneath in large type appeared: "She has carefree hot water service in her home."

Photographs told practically the entire message for an ad entitled "Every Age Needs Hot Water." They illustrated hot water's use for shaving, cleaning, dishwashing, a "pick-up" bath, and caring for babies.


HENRY-Y-Y DID YOU TURN OFF THAT OLD WATER HEATER?
... the question
● The question is in order, of course. But poor Hank need not fuss and fume any longer. An Automatic Water Heater will solve the problem for all time ... for himself ... for the whole family. Once installed, this magic new convenience supplies all the hot water needed without the slightest bit of attention. Such amazing performance saves so much time, energy and money, it's poor economy to heat water any other way. Come in or 'phone for a representative ... get the whole story .. learn how little it costs to have Automatic Hot Water Service in your home
ILLINOIS POWER AND LIGHT CORPORATION

Catchy titles and effective drawings feature the advertising used in Illinois Iowa Power Co.'s current water heater campaign.

■ ■

Lone Star Serves Dinner Cooked at Texas Fair

A free dinner is served daily by Lone Star Gas System as part of its exhibit and program at the Greater Texas and Pan American Exposition in Dallas, Texas. Guests are chosen by chance from among persons attending the cooking demonstration conducted daily by Miss Albertine Berry, home economist for Lone Star. The food served is that which is prepared during the demonstration.

Each visitor receives a card upon entering the auditorium for the cooking show. At its close there is a free drawing, and the holders of the lucky numbers are entitled to dinner in the private dining room which is part of the company's exhibit.

The model kitchen on the stage of the auditorium is a half hexagon, with all gas appliances in full view of the audience as Miss Berry works in the center of the stage. These appliances include a modern gas range, Electrolux gas refrigerator, and automatic gas water heater, all in white. The color scheme is delphinium blue, yellow, and orange, with chromium trim.

A work kitchen, with Electrolux gas refrigerator and modern gas range, is at one side of the stage. Here foods are made ready for the public demonstration. Hot water is supplied by the heater on the stage.

The dining room, 10.4x14 feet, is furnished in maple.

■ ■

So. Calif. Utilities Sponsor "Mode-O-Mat" Range Drive

Beginning September 20 and running through to November 6, Southern California Gas Co., Southern Counties Gas Co., gas range manufacturers, and gas range dealers will join in an extensive promotional campaign to sell Southern California gas customers on automatic cookery.

The word "Mode-O-Mat" has been invented to describe the modern automatic features of the gas range, and this word will be applied to the type of range which will be presented to gas customers through co-operative newspaper advertising, radio announcements, and special advertising media.

One feature of the campaign is a $6,000 prize contest sponsored by the gas range manufacturers' division of the Pacific Coast Gas Association. This contest will be a combined missing word and statement contest, open to residents in the territory served by Southern California Gas and Southern Counties Gas Companies. Employees of any of the sponsoring group are excluded.

■ ■

Mississippi Power Co. Beats Summer Slump Bogey

To prevent a summer slump in the number of commercial gas customers served, Mississippi Power & Light Co., Jackson, Miss., conducted a contest called the Summer Service Handicap. The plan of the campaign was based on a horse race. The fifteen local managers were jockies. Their districts were named after well-known race horses. First prize was won by R. B. Wilson, Cleveland manager, whose district made 248 per cent of its quota.

Results of the campaign were as follows: 84 customers retained, 60 new customers, 30 automatic water heaters, 31 tank heaters, 29 restaurant ranges, 21 domestic ranges, 19 hot plates. 20 urn burners, 2 bake ovens, 10 new and 3 replace boilers, 5 steam tables. 1 metal pot, 2 hair dryers, 2 burners, 3 torches, 26 major and 36 small appliances.

■ ■

Peoples Gas Builds 3 Homes

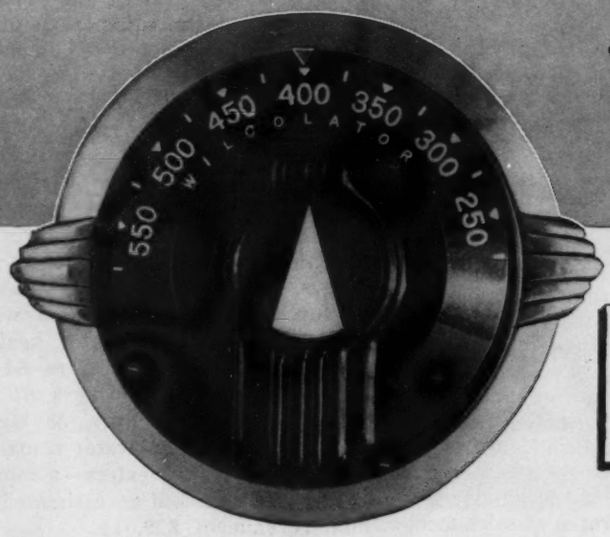
Three model homes, completely gas equipped, are under construction by The Peoples Gas Light and Coke Co., in Chicago, Ill., and will be opened in October. The houses are in the three main sections of the city. One is in the northwest, one in the west, and one in the south district. The houses will feature gas heating, modern gas ranges, Electrolux refrigerators, gas ironers, gas water heaters, and gas incinerators. The home planning bureau of the utility designed the kitchens.

ANNOUNCEMENT!

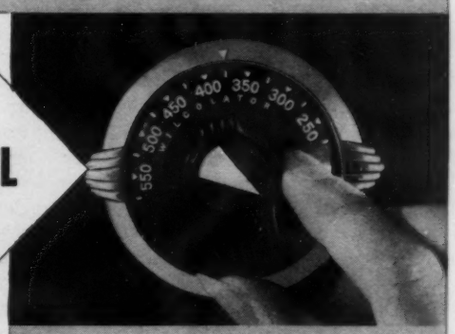
New Wilcolator VISI-THERM

OVEN HEAT CONTROL

takes mystery out of oven thermostats

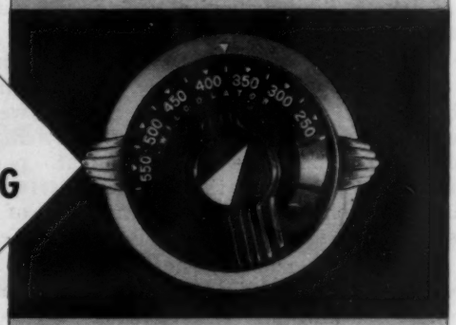


SET DIAL



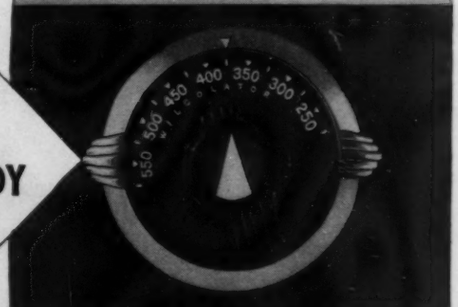
TURNING ON OVEN—Indicator points to room temperature position. Remains there until oven is lighted.

INDICATES PRE-HEATING



OVEN IS HEATING—Indicator rises gradually—shows oven heat *at all times* during pre-heating.

SIGNALS WHEN READY



OVEN IS READY—Indicator stops at desired temperature. Remains there in *vertical* position.

Shows Oven Temperature ALL THE TIME!

For the first time in gas range history, the new Wilcolator Visi-Therm controls oven temperature and indicates at all times just what that temperature is. The Wilcolator is an entirely different, distinctive development because its visual pointer tells oven temperature at *all* times, rotating gradually with every change from room temperature to desired dial temperature . . . and down again.

The new Wilcolator Visi-Therm is simple, compact, small and beautifully designed. It combines the features of a high-capacity, extremely sensitive oven thermostat with an accurate temperature indicator . . . all in one easily installed unit. Visi-Therm's new valve construction permits a higher gas capacity than has heretofore been available, making possible greater efficiency and faster pre-heating.

The new Visi-Therm helps sell more gas ranges because it takes the guesswork and uncertainty out of oven cooking. Women understand thermometers and therefore they will understand Visi-Therm. It is a visible, simple aid to better cooking in step with modern gas range design and modern kitchen efficiency.

For salesmen and dealers, Visi-Therm takes the mystery out of thermostats—gives them entirely different sales points that stand right out and shine during every demonstration. Give *your* salesman this revolutionary new feature in 1938. For complete details, just write us a note on your stationery.

THE WILCOLATOR CO.

Newark, New Jersey

Portland Utility and Dealers Sell 965 Ranges in Six Weeks

By DONALD M. JOHNSTON
Portland Gas & Coke Company

AN "air circus" campaign, during which dealers and gas company salesmen sold 965 gas ranges, was conducted for six weeks last spring by the Gas Appliance Society of Oregon and the Portland Gas & Coke Co.

While in a sense the dealer campaign was separate from that of the gas company, the purposes and objectives were essentially the same. So was the theme—airplanes.

Vehicles differed slightly, but both campaigns were based on operations of an air force during the World War. The dealer campaign was known as an "air circus" and the company activity as a "contact" campaign. Each dealer's team or "squadron" was given a name such as "Dawn Patrol," as were the three "squadrons" of gas company residential salesmen.

Individual contestants won promotions as they sold gas ranges. All started as flying students or "kiwis" and became "cadets" with their first sale. From there the rank increased according to sales.

Sales were scored as enemy planes shot down in combat and pilots' records were given from time to time in bulletins, on score boards, and at meetings. In all of these the wartime atmosphere was recreated as far as possible.

Competition among the dealer salesmen was entirely individual, with each "pilot" working for cash awards as well as the grand prize of a three-day, expense-paid trip to the Roundup at Pendleton, Ore., September 16-18. Award of the grand prize was made at a drawing which was participated in by those pilots who had achieved at least the rank of "ace" by selling five gas ranges. E. E. Herman of the Meier & Frank Co. was winner of the trip.

Dealer salesmen also were eligible to compete for prizes offered by the American Gas Association during its annual gas range campaign. Local cash bonuses also added to the general enthusiasm.

Prizes for the gas company's residential salesmen consisted of individual, squadron, and squadron commander cash prizes. To sustain interest further, a money and cigarette board was operated at sales meetings with "pulls" for each sale of a premium range. Gas company salesmen also were eligible to participate in the American Gas Association's national competition.

A special prize of a trip to Stanford University to attend a conference of junior business executives during the week of July 18 was offered by Paul B. McKee, president of the gas company, to his most outstanding "pilot," who proved to be J. Thomas Kennedy of the Vancouver, Wash., district. Mr. Kennedy sold 21 ranges.

An especially effective customer inducement was a 23-piece set of Pyrex cooking wear valued at $14.50 retail and offered free with the purchase of a premium range.

A high light which added considerable interest to the entire campaign and brought it local publicity as well was the offer of the United Air Lines to take ten leading "pilots" on a scenic air trip. Five dealer and five company salesmen made the flight.

The Portland Gas & Coke Co. turned from the air circus campaign to a six-weeks' drive called the "Four Aces of Home Comfort." The ace of hearts signified modern gas cookery, the ace of spades automatic storage water heating, the ace of diamonds gas refrigeration, and the ace of clubs house heating.

Participating in the campaign were more than 100 dealer stores employing 800 persons and 735 members of the gas utility. Company salesmen were divided into two teams.

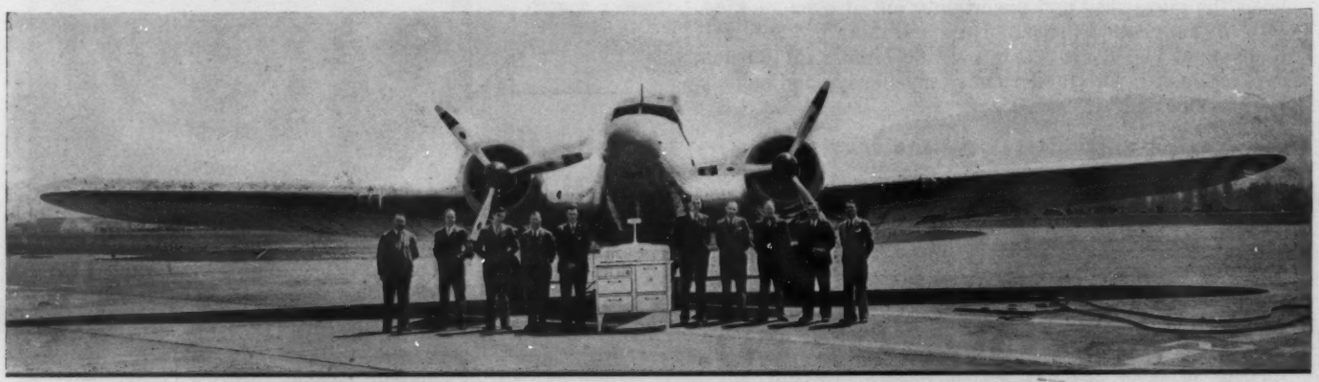
Achieving 97.8 per cent of an ambitious quota, the campaign accounted for the sale of 334 tank water heaters, 141 storage water heaters, 297 ranges, 132 refrigerators, 84 hot plates, 25 conversion burners, 67 furnaces, 6 radiant heaters, 38 Gascotrols (automatic hot water controls), and 17 circulating heaters—a total of 1141 appliances and an estimated annual revenue of $29,014.

The campaign theme offered a wealth of promotion ideas. The extensive advertising program included 50 billboards and banners on gas company and dealer trucks as well as stickers, folders and newspaper advertisements.

■ ■

Maloney Retail Sales Head

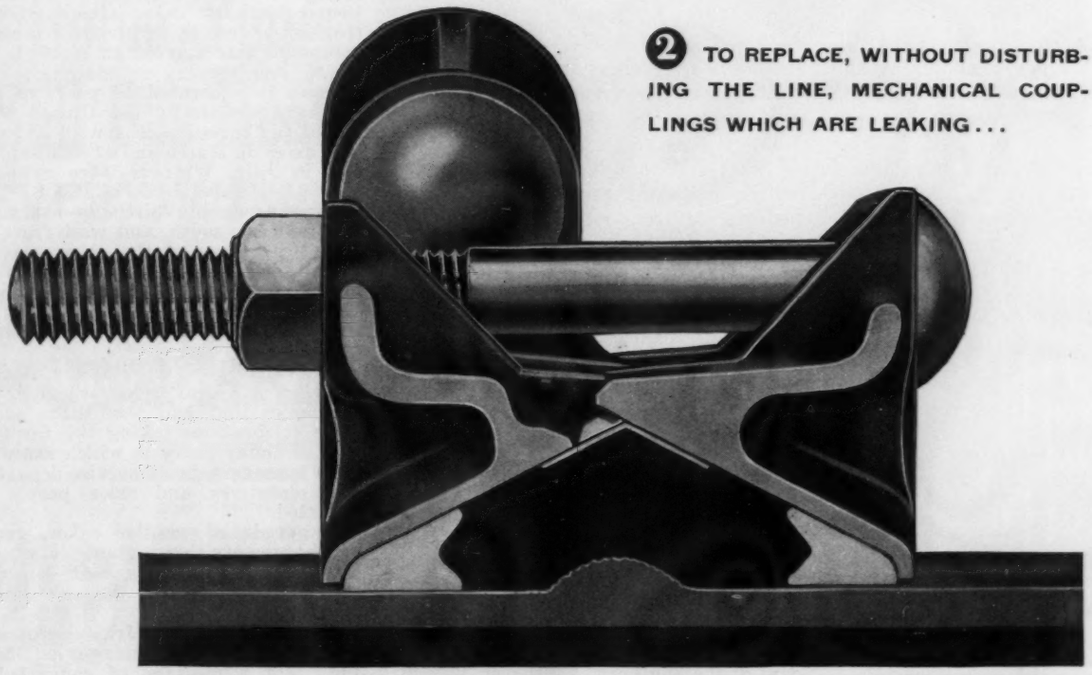
A. J. Maloney, who has been assistant to the general sales manager, Washington Gas Light Co., Washington, D. C., has been promoted to the position of retail sales manager, according to H. M. Brundage, Jr., general sales manager. Mr. Maloney joined the company in 1931 as field salesman in the new business department.



Because airplanes furnished background for an "air circus" gas range campaign conducted by Portland Gas & Coke Co. for its own and dealer salesmen, United Air Lines took ten leading "pilots" of the campaign for a scenic trip in this transport plane.

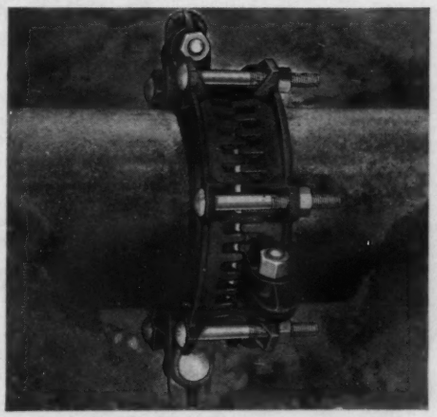
❶ FOR REPAIRING PIN HOLE LEAKS OR SPLITS AT WELDS, IN WELDED STEEL PIPE...

❷ TO REPLACE, WITHOUT DISTURBING THE LINE, MECHANICAL COUPLINGS WHICH ARE LEAKING...



Cross section shows how gasket is completely confined and SEALED against soil or air by Monel band at top, and hard vulcanized tips at sides.

SKINNER HIGH PRESSURE WELD CLAMP



This remarkable Skinner clamp not only stops the leak but introduces an element of flexibility at that point which prevents future trouble. One man can apply, quickly and easily under normal operating pressure. An instant, effective, lasting repair — lighter and less expensive than a mechanical split sleeve. Tested to 800 pounds line pressure. Pipe sizes 2″ to 24″. Write for catalog.

M. B. SKINNER CO. *Est. 1898* SOUTH BEND, IND.

Pacific Coast Revenues Increase 13.7% During 1937 Over 1936

PACIFIC Coast gas revenues increased 13.7 per cent during the first six months of 1937 over the revenues for the corresponding period of 1936, it is revealed in statistics compiled by Paul Ryan, chief statistician of the American Gas Association. The figures cover California, Arizona, Nevada, Oregon, Washington, and British Columbia, Canada.

Revenue for the first half of this year amounted to $51,411,428, made up as follows:

		Change from first half 1936
Domestic (including house heating)	$37,585,701	+15.8
Industrial and Commercial	12,870,215	+10.9
Miscellaneous	40,741	
Electric Generation	914,771	—17.9

Gas sales gained 14.3 per cent over the first half of 1936. Detailed figures are as follows:

	M c. f.	Change from first half 1936
Domestic (including house heating)	$47,009,879	+27.9
Industrial and Commercial	53,843,582	+11.4
Miscellaneous	91,076	
Electric Generation	6,886,144	—24.7
Total	107,830,681	+14.3

Customers on June 30 numbered 1.779,761, or 3.8 more than on June 30, 1936.

Twelve natural gas companies in California, whose sales constitute 99 per cent of the utility sales in the state, reported a total revenue increase of 13.6 per cent over the first half of 1936; an increase in gas sales of 12.6 per cent; and an increase in customers on June 30, 1937, of 4.1 per cent over June 30, 1936.

Five companies, whose sales of natural and manufactured gas in Arizona and Nevada constitute 99 per cent of the total sales in the two states, reported a revenue increase of 43.6 per cent, gas sales increase of 59 per cent, and a 7 per cent gain in customers.

Two Oregon utilities serving manufactured gas and selling 98 per cent of the gas served in the state, enjoyed a revenue gain of 4.2 per cent, gas sales gains of 13 per cent, and a gain in customers of 0.4 per cent.

In Washington, where the sales of 5 reporting companies serving manufactured gas comprise 98 per cent of total sales, revenue increased 5.8 per cent; gas sales increased 13.0 per cent, and customers made a gain of 1.4 per cent.

Two British Columbia companies selling manufactured gas cover 99 per cent of total sales, and they reported for the six months period of 1937 revenue gains of 4.0 per cent, gas sales increase of 7 per cent, and a gain in customers of 2 per cent.

■ ■

Payne Furnace & Supply Co. Buys Electrogas Furnace

ELROY PAYNE

Purchase by Payne Furnace & Supply Co., Beverly Hills, Calif., of the Electrogas Furnace & Manufacturing Co., San Francisco, was completed recently, according to announcement by Elroy Payne, president of the Southern California firm. New construction will start at the San Francisco plant at once.

Electrogas Furnace and Manufacturing Co. will operate in the future as a subsidiary of the Payne Beverly Hills plant. Don D. Fleming is assuming the position of general manager of the company, which will be known as the Electrogas Division of the Payne Furnace & Supply Co. Inc. W. W. Norton will continue with the firm as superintendent.

The Electrogas Division will be operated independently from the Payne company, except that production and merchandising policies will be consistent with the policies established by Payne.

Construction will start immediately on addition to the present Electrogas plant that will give an added 12,000 sq. ft. of factory space. New machinery will be purchased and installed and the plant made modern in every respect.

■ ■

United Gas Corp. Serves Gas In Washougal, Wash.

United Gas Corp. of Washington is now serving gas in Washougal, Wash., following the laying of 16,000 ft. of 2-in. mains and about 1000 ft. of 1-in. laterals, according to announcement by W. K. Peery, manager at Washougal. Later the company plans to extend service to include the Weir Park and Midland Acre districts, he states.

Gas is carried from the company's plant in Oak Park. United Gas Corp. is a successor to Natural Gas Corp. of Washington, which served butane air mixed gas by separate plants to Port Townsend and Port Angeles. A plant in Camas was built seven years ago.

Companies Celebrate Servel Victory With 150-lb. Cakes

TWENTY-THREE gas companies, victors in the Tenth Anniversary contest for the sale of Servel Electrolux refrigerators, have now received the 150-pound birthday cakes which were the trophies offered by its sponsors when the campaign was started on April 1. The Tenth Anniversary campaign, so-called because it celebrated 10 years of silent gas refrigeration in the United States, lasted for three months with a "warm-up" drive in March and a "clean-up" contest in July. Winners were announced in the September issue of G A S.

Twenty-two big birthday cakes were shipped east, south, and west from New York City (one of the cakes was won by Consolidated Edison Co., New York), with a view to having the trophies arrive simultaneously at their respective destinations. The cakes were baked by Schrafft's.

Arrival of the trophies was made the occasion of local celebrations by the companies that had won them, each of these celebrations taking the form of a final birthday party in which executives, sales managers, home service department representatives and sales people participated.

Hundreds of smaller cakes, replicas of the twenty-three giant cakes, were sent to those utilities that joined the campaign and carried through until the end.

George S. Jones, Jr., vice-president and general sales manager of Servel, Inc., sent a message of congratulation to all sales managers of the competing companies.

■ ■

Karl P. Fuhrmann Appointed Scaife Sales Manager

William B. Scaife & Sons Co. of Pittsburgh, Pa., manufacturers of steel tanks, galvanized range boilers, gas cylinders, and water purification apparatus, has announced the appointment of Karl P. Fuhrmann as general sales manager.

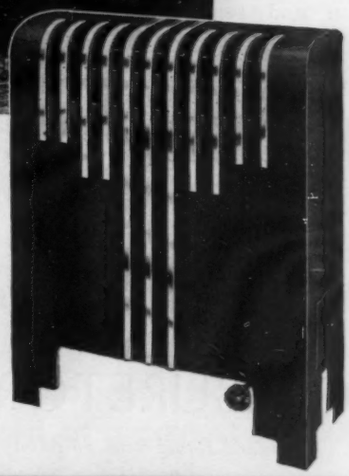
Mr. Fuhrmann, who in his earlier years was associated with the Bell Telephone Co. as field engineer, then The Algoma Steel Co. at Sault Ste. Marie, Canada, and later the Erie Forge & Steel Co., was with the Wheeling Steel Co. for twenty years. He was first in the maintenance and operating departments, then was assigned to the sales department. At the time of his resignation from the Wheeling Steel Co. he was manager of the range boiler and tank division.

■ ■

Map United Gas Heating Drive

"Better Heating" was the theme of a sales meeting of United Gas Public Service Co. at Beaumont, Texas, when fall and winter business compaigns were planned. Approximately 125 company representatives from Texas, Mississippi, and Louisiana attended. Among officials who spoke were J. V. Strange, vice-president; H. P. Carroll and A. D. Kerr, superintendents of distribution; W. F. Ivers, district manager at Beaumont; D. A. Strickland, division sales manager; Harry Cain, Jr., dealer sales director; A. B. Banossky, sales engineer, and J. O. Jackson, residence sales director.

Helps You Sell Gas Heat EVERYWHERE



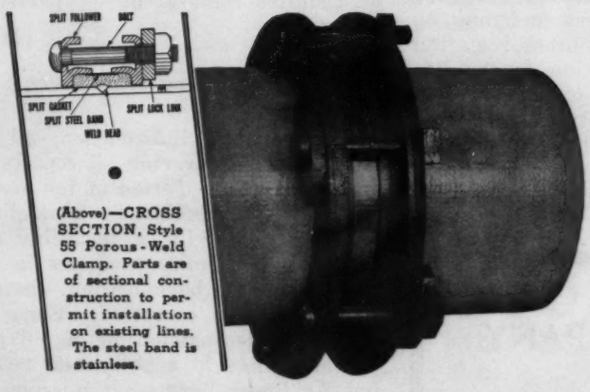
No. 30C HUMPHREY CIRCULATOR

Heating entire homes and shops in warm states and supplementing central heating plants in the colder areas, the new modern Humphrey Circulator is a great builder of good will for gas heating. This compact heater, approved by AGA Testing Laboratories, has an input rating of 30,000 B.t.u. It is finished in a beautiful Walnut Brown with distinctive Chrome trim. Thermostatic control and fan equipment for forced circulation are provided at slight additional cost. Write today for complete sales data.

A HUMPHREY PRODUCT

GENERAL GAS LIGHT CO. KALAMAZOO, MICHIGAN

STOP POROUS-WELD LEAKS!



(Above)—CROSS SECTION, Style 55 Porous-Weld Clamp. Parts are of sectional construction to permit installation on existing lines. The steel band is stainless.

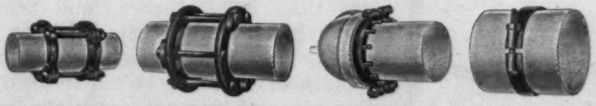
Porous circumferential pipe welds, and small pin-holes and leaks in pipe are quickly stopped with Dresser Style 55 Porous-Weld Clamps, without interrupting service. Repair is inexpensive, permanent, suitable for high working pressures.

DESCRIPTION. Each Style 55 Clamp consists of a few, simple "factory-made" parts (see cross section), which are quickly assembled over the leak with only one tool—a wrench.

SIZES. Style 55 Clamps are available in sizes 1¼" I.D. to 26" O.D., inclusive. (Sizes 4" I.D. and smaller have malleable followers; all other sizes, pressed-steel followers.)

HOW TO ORDER. Give: (1) quantity; (2) nominal size and outside diameter of pipe; (3) style number; (4) service—gas, water, oil, etc.; (5) maximum working pressure; and (6) outside diameter and width of weld bead.

OTHER DRESSER REPAIR CLAMPS



Style 4 Collar Clamp is like Style 41, except made for sizes ¾" to 4" I.D. only.

Style 41 Collar Clamp stops leaks through threads of screw collars; sizes 6⅛ to 15" I.D., incl.

Style 74 Screwed-Fitting Clamp is for repair of leaks through threads of screwed fittings.

Style 77 Band Clamp stops leaks through small holes or pits in pipe.

Style 79 Type 2, Split Repair Clamp fixes splits and pitted sections of pipe. Furnished also with two half-shells and straight bolts (Type 1).

Style 78 Saddle Clamp repairs leaks in pipe 4" I.D. or smaller. Two or more can be butted together.

S. R. DRESSER MFG. CO.

BRADFORD, PA.

In Canada: Dresser Mfg. Company, Ltd., 60 Front St., West, Toronto, Ont.

Lone Star Uses New Record System to Check Compressor Repair Costs

NEW forms which have greatly facilitated control of maintenance and repair costs on compressor engines have been put into use in the compressor department of the Lone Star Gas Co., Dallas, Texas, in a new system of records. Compilation and assemblage of the data transferred to the new forms was in charge of O. H. Moore, assistant superintendent of the compressor department, under the direction of B. L. Rogers, superintendent.

Since 1927 it has been the practice of the department to require men in charge of plants to keep an itemized account of all major repair parts to compressor engines. Record has always been kept according to drawing and item numbers as used by manufacturers, description of part, reason for failure or removal of part and hours of service which it has given.

This information was, under the old system, entered in the chief engineer's log book for future reference. In addition to the plant log, a monthly repair report was compiled and a copy mailed into the main office.

Monthly Report Fails

This monthly repair report, however, with parts entered heterogeneously, failed to tell the story of what was actually taking place when an engine was shut down for repair. It was not until records were systematically arranged so that all parts were grouped according to (1) power end, (2) compressor end, (3) power end exhaust, that it was possible to prove definitely that the life of one part is directly affected by the life of one or several others, and that the repair costs of a compressor station are in direct proportion to the life of the parts incident to a repair job.

The new set of control records, being installed in all plants as well as at the main office, is designed to meet this need. The plant record consists of one 8½x11-in. binder containing indices in the above three groups. In No. 1 (power end) the following information is kept on one sheet: Date of repairs, engine hours between repairs, cumulative hours of operation; hours of service given by liners, piston, rings; micrometer readings in the horizontal and vertical plants three inches from the head end and 14 or 17 inches, as the case may be, from the head end; description of material according to company make and type; condition of old part and reason why it failed.

Information on No. 2 (compressor end) is the same as above except that service hours are kept on compressor liners, pistons, rings, rods and packing. On the power end exhaust, or No. 3, the information is also the same except for service on exhaust valves, seats, bushings, and springs.

An office record is kept for each side of each engine and the record books are so arranged that only repairs to the left side of an engine can be entered on record sheets opened to the left. On sheets to the right of the record book, only repairs for the right side of the engine can be entered. This method eliminates errors in recording repairs to either side of an engine and is essential in determining the actual number of service hours which a part gives.

At the bottom of each sheet is space for the record of "parts removed but not worn out." This is also essential in determining the life of a part since frequently a different size cylinder is required to handle different load conditions, which necessitates removal of all parts in the cylinder.

Information on One Sheet

This compact information, all on one sheet and covering all repairs to an engine over a period of ten years, is infinitely valuable in controlling repair costs. Since installing the system many faulty practices in engine repairing have become obvious and are being corrected. Some of these include installation of old piston and rings in a new liner, reboring a cylinder liner when micrometer readings show the liner to have worn less than 0.090 inches, and renewing exhaust valve seats without renewing the bushings, or vice versa.

Main office records are more complex since they must cover the same information for all plants. The principle is the same, however, with the exception of keeping three separate books for power end, compressor end, and power and exhaust, respectively.

HOLZAPFEL
LOW PRICED
GAS
(AND BUTANE)
CARBURETORS
Standard Equipment on Many Engines

MAXIMUM ECONOMY
MAXIMUM RELIABILITY
MAXIMUM POWER
EASY STARTING

Holzapfel Manufacturing Co.
136 Sotello St., Los Angeles, Cal.

THE HARRIS CALORIFIC COMPANY
5501 Cass Ave. N. W., Cleveland, Ohio

PIONEERS
In City and/or Natural Gas Cutting Apparatus

Extends to the Delegates of the A.G.A. Convention a Cordial Invitation to visit its New and Modern Production Plant.

1937 FALL GAS RANGE CAMPAIGN

Where

Territory served gas by the Pacific Gas and Electric Company and the San Joaquin Light and Power Corporation (except the town of Bakersfield).

•

When

OCTOBER 2-9, INCLUSIVE, WITH THE SLOGAN "Tune Up Your Kitchen With a 1938 Gas Range"

•

How

With your own smashing selling campaign backed up by the following features furnished at a cost of $12,000 by the Society and the utilities—

•

1 Advertising in 239 Newspapers.

•

2 Recorded Radio Announcements on 20 Stations.

•

3 Announcement on "California Tales" Radio Program, October 3.

•

4 Free Dealer Display Cards (20 x 30).

•

5 Free Mat and Publicity Service to Dealers and Newspapers.

•

6 Cash Prize Contest for Best Campaign Windows.

•

7 Cash Prize Contest for Best Campaign Newspaper Ads.

Special Campaign Offer

SAVE

$10.00

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

Owned - Operated - Managed by Californians

G 210-1037

Standards Bureau Holds Los Angeles, Houston Soil Corrosion Conferences

THREE papers—and possibly four—were to be read by the authors at a soil corrosion conference on September 23 in Houston, Texas, to be conducted by the U. S. Bureau of Standards under the personal direction of Dr. K. H. Logan, chief of the underground corrosion section of the Bureau. Starr Thayer, corrosion engineer, United Gas Public Service Co., was chairman of the conference, which was a preliminary to the national conference in Washington from November 15 to 17.

Walter F. Rogers, Gulf Oil Corp., Houston, was scheduled to read his paper on "Effect of Soil Properties on Corrosion." S. U. McGary, United Gas Public Service Co., Houston, was to present " Ground Beds for Electric Protection Units," and Gene Rolfs, Crutcher-Rolfs-Cummings, Houston, was to give his paper, "Windmills for Electric Protection."

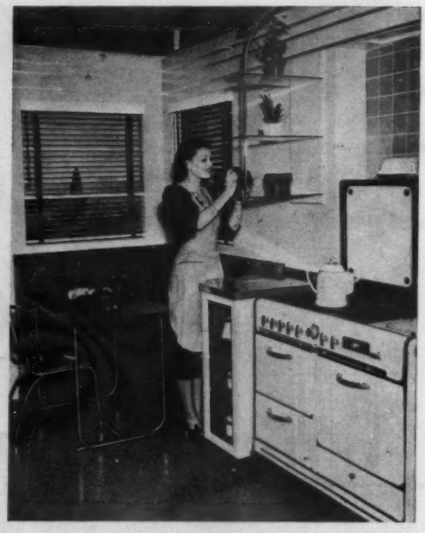
"A Method of Protecting Pipe Lines against Electrolysis," by W. Beck, University of Warsaw, Warsaw, Poland, was to be presented either by the author or by his representative.

Other papers and additional subjects were on the program for discussion, to be determined largely by the wishes of those in attendance.

Prior to the Houston meeting, Dr. Logan conducted a similar half-day conference in Los Angeles, Calif., on September 14. One hundred engineers and other technical men attended, representing every branch of industry in the territory using underground carriers. W. M. Henderson, superintendent of Central Division, Southern California Gas Co., was chairman. The meeting was held in the Southern California Gas Co. building.

A paper, "Properties of Asphalts," by Dr. U. B. Bray, Union Oil Co., was read by his associate, W. E. Grebe. Harry Hayes, Bureau of Water Works and Supply, City of Los Angeles, read his paper, "Tests and Specifications for Protective Coatings," which dealt largely with coal tar as a pipe protective material.

Dr. Logan, who planned the regional conferences to enable engineers in the West and Middle West to hear some of the papers that will be presented at the general conference in Washington, D. C., and to discuss local problems, addressed the meeting.



Terry Ray, Paramount player, visits the All-gas kitchen at the Los Angeles County Fair exhibit.

Show Kitchens & Gas Engines At Los Angeles County Fair

The gas industry is represented this year at the Los Angeles County Fair, which opened September 17, by two exhibits. The domestic appliance exhibit in the main building features two display kitchen sets, each suggestive of the charm and convenience that may be achieved by following the smart modern lines of gas appliances. In addition, the exhibit carries a full display of water heaters, ranges, and gas refrigerators.

The industrial display in the Machinery Building is featuring various types of natural gas engines for water pumping. Connected and operating, these engines are pumping a supply of water to a fountain in the center of the exhibit, around which comfortable chairs are arranged where friends of the natural gas industry may rest and visit.

■ ■

Texas Bill Limits Sour Gas Take in Panhandle

Limiting the top allowable of sour gas to 750,000,000 cu. ft. daily, a bill has been passed by the Texas legislature that is aimed to prevent waste of natural gas in the Panhandle. The amount allowed includes gas used for making carbon black.

Owners of sweet gas wells without outlet connections may apply to the Railroad Commission within 120 days for permission to sell 10 per cent of the well potential for utilization, the present plan for sour gas. Sweet gas for such use in a gasoline processing plant is limited under the bill to one-third the residue the plant uses for carbon black manufacture.

■ ■

Cabot Petitions for Line

Plans of Godfrey L. Cabot, Inc., to construct a high-pressure gas transmission line from a point near Sissonsville to a point near Big Bend, W. Va., were set forth in petition filed with the State of West Virginia Public Service Commission. Hearing was set for September 23.

WILLIAMS-WALLACE COMPANY
160 HOOPER STREET, SAN FRANCISCO, CALIF.
Send me your descriptive bulletin and price list covering
METALBESTOS GAS VENT and FLUE PIPE
*Name*_____
*Organization*_____
*Street Address*_____
*City and State*_____
METALBESTOS *is the original insulated aluminum gas vent pipe. It is rated the highest in efficiency, safety and durability.*

GAS STOPS

G-491—High Pressure Roundway Gas Main Stop Male and Female

G-207 Solid Lever Standard Gas Stop
"by Kitson"
Surest Guarantee of Quality for Forty Years! . . . The
KITSON COMPANY
2409-15 Westmoreland St. Philadelphia, Pa.
Kitson Safety Devices (Lovekin Patents) for Domestic Water Heaters
Quality Brass Goods for Gas, Water and All Plumbing Uses
ESTABLISHED 1897
Look for the K-CO TRADE MARK

COOPERATIVE LOAD BUILDING

P. C. G. A.

BULLETINS

COMMITTEE
A. C. JOY, (P. G. & E.)
Chairman
FORREST RAYMOND
(San Diego Cons. G. & E. Co.)

COMMITTEE
J. S. SPAULDING
(So. Calif. Gas Co.)
CLIFFORD JOHNSTONE
Managing Director
Pacific Coast Gas Association

ANOTHER LINK IN A LONG CHAIN

FATHER: "I beg, I plead! The thermometer says it's 70 and you say it's chilly. I can't stand hot rooms!"

GRANDMA: "Now, now John. Even as a boy you were excitable—and stubborn. Keep cool and you'll feel cool. I'm going to have more heat."

If STRIFE BEGINS AT 70

...end it with *flexible* gas heating

At 70 degrees, most of us are comfortable. But Old Age often demands considerably higher room temperatures. *A problem instantly, happily solved with modern gas appliances.* Let Grandmother "toast" to her heart's content with ... unit *in her own room*—sup... central heating system. ☆ ... in *any* room—bathroom, ... porch, playroom—install a ... wall furnace, circulating heater, gas-steam radiator or radiant unit. Each is inexpensive and economical to operate, and may be equipped at small cost with full automatic ...

Pixied by Jed Prouty and Florence Roberts of "... Twentieth Century-Fox Studios. Laugh with ... rowing Trouble"—Coming soon to your neighb...

HEATING • COOKING • H...

P. C. G. A. Regional Cooperative advertising has appeared in western magazines for nine consecutive years. The message posted above is scheduled in October issues of domestic publications. Through the "Jones Family" of motion picture fame, it tells a dramatized sales story. Objective—to help increase the demand for *supplementary gas heating appliances* as well as central heating plants. This advertising is financed wholly by the Gas Companies in the interest of appliance manufacturers and dealers.

Frank J. Simpson Heads Thor Gas Appliance Division

F. J. SIMPSON

Frank J. Simpson, who for the past 20 years has been connected with sales of Thor washers and ironers, manufactured by Hurley Machine Division of Electric Household Utilities Corp., has recently been made head of the newly created gas appliance department.

This department was created to promote the sale of three new gas appliances: the Thor gas-heated washer, gas-heated clothes dryer, and gas-heated ironer.

Merchandising plans have been formulated to assist gas companies in promoting the sale of these products, which, the company says, offer load-building possibilities at off-peak periods.

■ ■

A. W. Lohn Named General Manager of Ducommun

Emil Ducommun announces the appointment of A. W. Lohn as general manager for the Ducommun Metals and Supply Co., Los Angeles, Calif. Mr. Lohn has been connected in various capacities with the Ducommon company since 1911.

Announcement is also made of the company's appointment as California distributors for National Pipe. G. W. Owens is manager of the pipe department.

The Ducommun Metals and Supply Company also represent in California the following commodities used by the gas industry: Yale & Towne Hoists, Anaconda Brass & Copper, Toledo Threading Devices, Electrunit Boiler Tubing, Walworth Valves & Fittings and Westinghouse Electric Welders. They operate sales offices and warehouses in both San Francisco and Los Angeles.

■ ■

Gas Oil Ratio Set in Otis Field, First in Kansas

A gas-oil ratio, the first in Kansas, was set on August 14 by the State Corporation Commission in an order fixing a ratio of 5,000 cu. ft. of gas to each barrel of oil produced in the Otis oil field in Rush and Barton counties. The order requires that if a larger amount of gas is produced, the excess must be returned to the formation from which it is produced.

The order affects 12 combination wells in the field. The remaining 35 wells produce gas only. At hearinngs before the Commission, testimony brought out that 5,000,000,000 cu. ft. had been wasted in the field since it was discovered.

The Commission expects to determine market demand for gas and fix gas allowables for individual wells. It is also conducting an investigation of waste in the Burrton Field in Reno County.

Kobabe Is Executive Manager Of Lee B. Mettler Co.

J. M. KOBABE

The Lee B. Mettler Co., manufacturers of Mettler entrained combustion gas burners, announces that James M. Kobabe has joined the organization as executive general manager.

Mr. Kobabe has been affiliated with the Mettler Co. for eleven years as a direct factory engineer, with a general distributorship of Mettler products in the central states. The James M. Kobabe Co., an Illinois corporation, maintained offices at Kansas City from 1926 to 1932, later moving to Chicago, where offices were established in the Peoples Gas Bldg.

Mr. Kobabe will be located at the general offices of the Lee B. Mettler Co. in Los Angeles, Calif., dividing his time with the Chicago office and other offices. Henceforth, the Chicago office of the James M. Kobabe Co. will be in charge of Earl E. Litz, who has had many years of experience in the gas industry.

Under the direction of Mr. Kobabe, the Lee B. Mettler Co. has planned a program of expansion.

■ ■

Puzzled by "Hello, Honey" Stickers? Read This

"Hello, Honey" was the summer password adopted by Minneapolis-Honeywell Regulator Co. in a novel promotion contest during the vacation season.

The company offered prizes to the employees who met the farthest distance from Minneapolis while on vacation. What enabled an employee to identify a fellow worker was a "Hello, Honey" sign on the windshield of his car.

First prize went to two members of the staff who met in Los Angeles, Calif., after traveling 2,193 miles. Other prize-winners met in Portland, Ore., 1,958 miles from Minneapolis, and in Salt Lake City, Utah, 1,418 miles distant.

The sign aroused a great deal of curiosity and proved to be a valuable source of publicity. Upon second glance the word "well" in small letters could be seen, so that the entire greeting read "Hello, Honeywell."

E. P. Shurick is sales promotion manager for Minneapolis-Honeywell.

■ ■

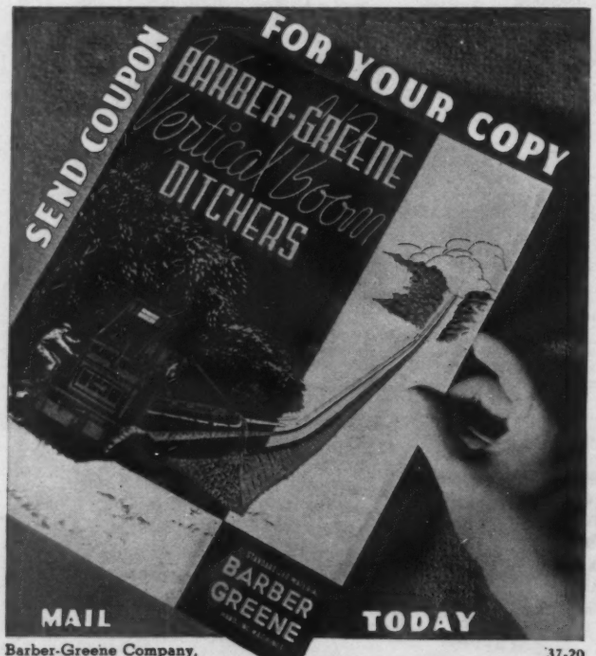
Texas Natural Pipes Placedo

Texas Natural Gas Utilities is soon to start piping Placedo, Texas, for gas, according to announcement by W. R. McCright, president. Gas will be taken from the J. and C. Drilling Company's Henderson and Pickering No. 1 in the Placedo Field.

■ ■

Finish Cambridge System

Aksarben Natural Gas Co. is completing the laying of pipe in Cambridge, Neb., in preparation for the introduction of natural gas service. Extension of the line from Holbrook to Oxford is expected soon.



Barber-Greene Company,
Aurora, Illinois.
Gentlemen:
Please send me your new 36-page catalog which shows all five Barber-Greene ditchers, giving complete specifications and 14 pages of job photos. I understand this incurs no obligation.

37-20 G

Name.....

Company.....

Address.....

City..... State.....

The Cleveland Trencher Company

Extends to the Members of

THE AMERICAN GAS ASSOCIATION

A Hearty Welcome to Cleveland

for Your Convention

We hope you will find time to visit us while you are in town. Telephone us anytime during your visit, and we will arrange for your transportation to the plant. We will appreciate the opportunity of showing you the latest developments in trenching machines and giving you a demonstration of their performance.

THE CLEVELAND TRENCHER COMPANY

"Pioneers of the Small Trencher"

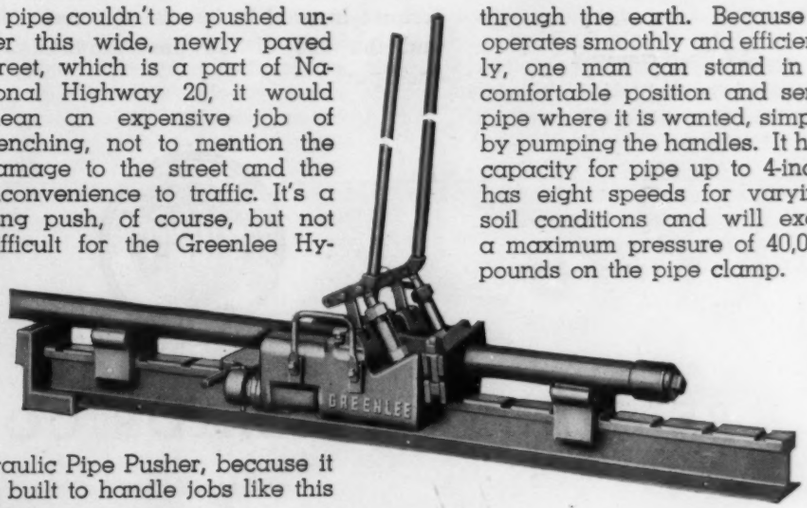
Manufacturers of: Cleveland Baby Digger and Cleveland Pioneer Trenchers—Cleveland Tamper-Backfiller—Cleveland Trailers—Cleveland Trench Guards, etc.

20100 St. Clair Ave., Cleveland, Ohio Telephone KEnmore 4100

It's a Long Push to the Opposite Curb

...But the GREENLEE is equal to the Job

If pipe couldn't be pushed under this wide, newly paved street, which is a part of National Highway 20, it would mean an expensive job of trenching, not to mention the damage to the street and the inconvenience to traffic. It's a long push, of course, but not difficult for the Greenlee Hydraulic Pipe Pusher, because it is built to handle jobs like this one.

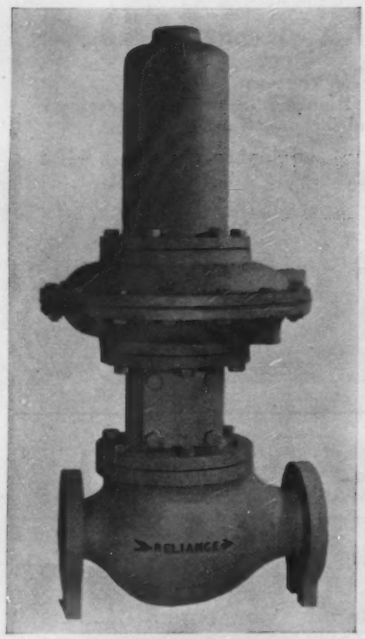


The Greenlee is a compact tool that is designed to use hydraulic pressure to force the pipe through the earth. Because it operates smoothly and efficiently, one man can stand in a comfortable position and send pipe where it is wanted, simply by pumping the handles. It has capacity for pipe up to 4-inch, has eight speeds for varying soil conditions and will exert a maximum pressure of 40,000 pounds on the pipe clamp.

Investigate this money-saving tool. Write for full information.

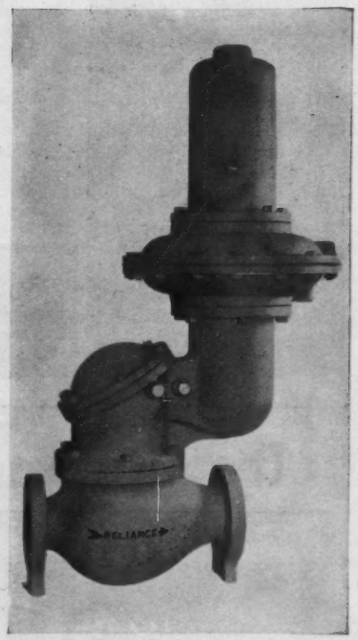
GREENLEE TOOL CO., 1700 COLUMBIA AVE., ROCKFORD, ILLINOIS

A NEW COMBINATION BALANCED VALVE REGULATOR



CBV Direct connected

These gas regulators have been newly designed throughout for the purpose of providing the advantages of interchangeability of parts, unit construction, reduced internal motion and friction, greater accuracy in control and maximum flow capacity. They are now available in a full range of sizes from 2 inch to 10 inch, and in spring loaded, lever weight loaded, dead weight loaded and pilot models. As reducing or back pressure regulators, they afford many combinations in assembly. Change from high to low pressure service is easily effected. A special stabilizer eliminates surging and pulsation. The offset types have a forged rocker arm equipped with oilite bearings and stainless steel rollers. All diaphragm heads are interchangeable on any size of both offset and direct connected high pressure types. Long life and satisfactory operation are insured by precision construction and the use of the best materials for each part.



CBV Offset connected

REGULATORS YOU CAN RELY ON — RELIANCE — SINCE 1910 — TRADE MARK

RELIANCE REGULATOR CORPORATION

Send for Bulletin

1000 MERIDIAN AVENUE ALHAMBRA, CALIFORNIA

RELIANCE REGULATORS

MEASUREMENT and CONTROL

Automatic Pressure Control

By C. H. McRAVEN

Engineering Department,
United Gas System

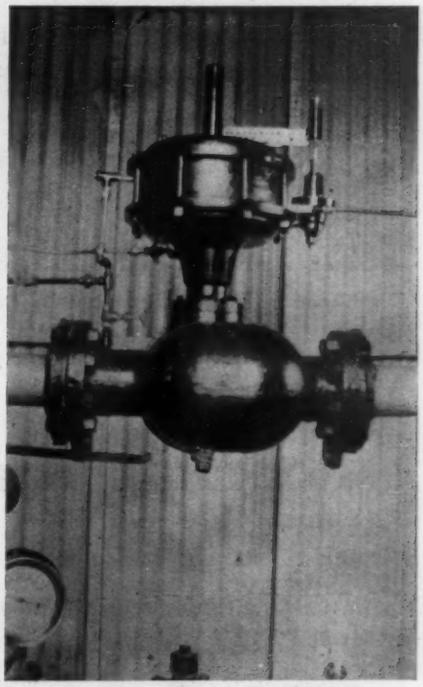
ONE of the latest developments in the pressure regulating field is the King boosting regulator, designed to automatically raise and lower the delivery pressure as the load increases and decreases. It is being used by the United Gas Public Service Co. in distribution systems and transmission lines where it is desirable to maintain as low a pressure as the load will permit at all times.

The force used to cause the boost in pressure is derived from the differential across an orifice at the regulator outlet; consequently the regulator responds to the load requirements regardless of time of day. It is adjustable so that during peak hours the pressure will not exceed a predetermined value and during off-peak hours will not fall below a fixed value. There is one now operating on an East Texas field line that boosts from 100 to 200 lbs.; another from 10 to 40 lbs. Most of those in service are handling distribution loads with the minimum set at about 3 lbs. and the maximum up to as high as 20 lbs., depending on the requirements of the system and the season.

At the present time we have 30 in service in Texas, the first having been in use for several years.

Outlet Pressure Shown

Fig. 1 shows the pressure at the outlet of a regulator controlled by this equipment serving a distribution system. In this case the regulator was adjusted so that the outlet pressure would vary between a minimum of about 3.5 lbs. and a maximum of 14.5 lbs. During the afternoon of January 8, the temperature began to drop and the increased load caused the pressure to build up until the demand fell off. The next morning, the temperature had dropped to about freezing, and the delivery pressure increased to a value which was sufficient to maintain adequate pressure on the entire system. The following morning the load was such that the delivery pressure reached its maximum and held it all morning and part of the afternoon.



The King boosting regulator.

The device which was developed by W. R. King of Mineola, Texas, is based on the idea of a double diaphragm, eliminating the necessity of changing weights or springs when sudden changes in the gas load occur. Patents are pending on the apparatus.

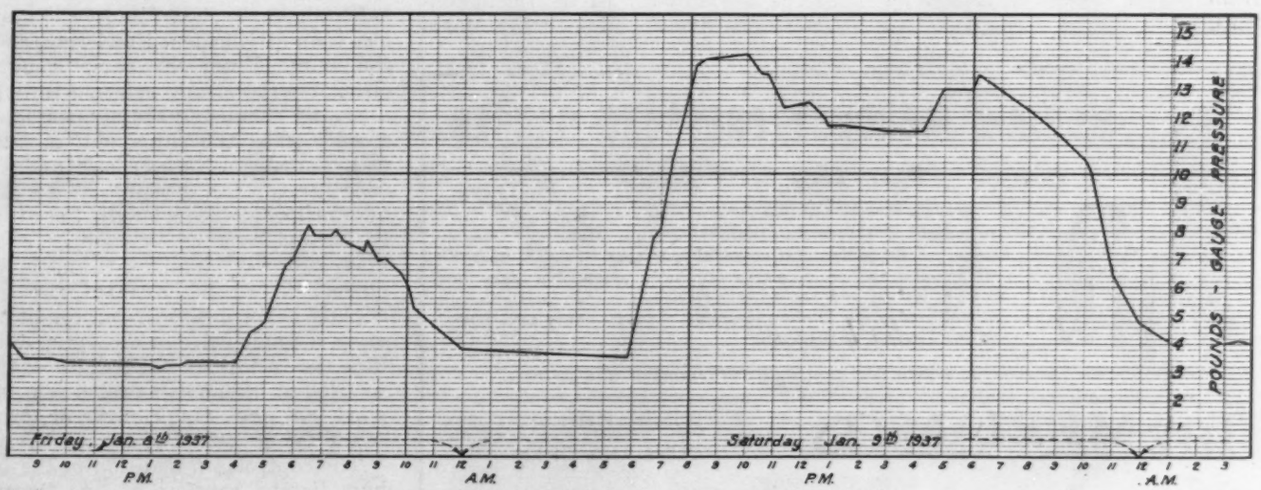
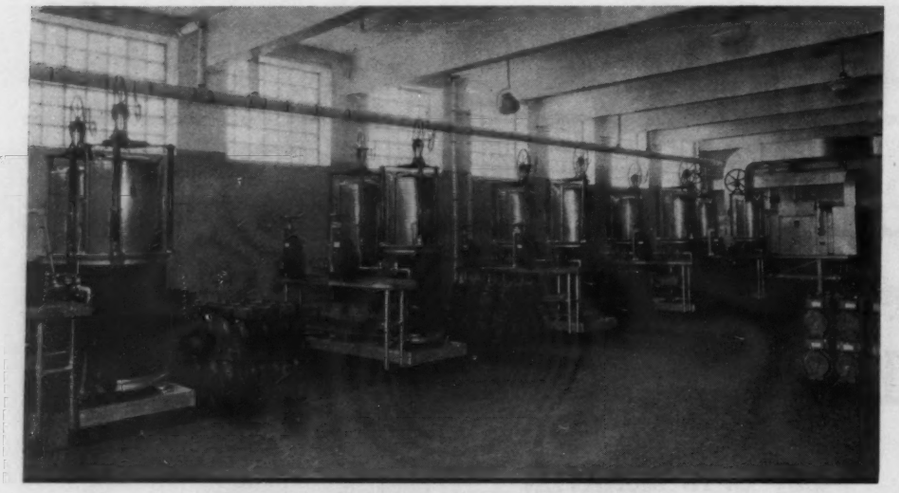


FIG. 1. The distribution regulator outlet pressure.



A general view of the Sprague Meter Company's new air-conditioned proving room.

New Sprague Meter Proving Room Is Air-Conditioned

TO eliminate as nearly as possible all hazards of chance and to obtain uniformity of performance of its gas meters, the Sprague Meter Co., Bridgeport, Conn., has built a new proving room which is fully air-conditioned for 75° F. and 45 per cent relative humidity. A proving room temperature between 60° and 90° has heretofore been accepted practice of practical meter men, according to Leslie Fairchild, vice-president of the company, in pointing out the advantages of closely controlled temperature.

F. L. FAIRCHILD

The new room measures 58 ft. long, 34 ft. wide, and 13½ ft. high. Its windows are of hollow glass blocks with a dead-chamber between to eliminate condensation forming on them and to afford maximum insulation. The glass blocks, translucent but not transparent, allow the light to enter but still afford privacy and eliminate the direct rays of the sun striking the instruments.

In the air conditioning system in the meter proving room, functions for year-'round conditioning are controlled separately or simultaneously from the same assembly without the use of by-pass ducts or any form of reheat. A gas-fired boiler is used the year 'round. The system is called the Kathabar.

The assembly for air treatment consists of a finned coil utilizing steam for winter heating, a lithium chloride contactor for humidifying and dehumidifying, a finned coil utilizing cold city water for summer cooling. Included also are a mixing chamber for fresh air and recirculated air, a filter, and a fan. This assembly is located in the meter room proper.

The cycle for humidity control incorporates the use of an aqueous solution of lithium chloride which, in contacting air, will either absorb water from or add water to the air, depending on the vapor pressure difference between the lithium chloride solution and the air.

The contacting medium as included in the air conditioning assembly is a wetted surface of 36 frames in depth, wound with cord. A constant flow of solution travels down the cord surfaces, coming in contact with the horizontal air flow. If dehumidification is required as called for by a humidistat set slightly higher than desired room conditions, a strong solution of low vapor pressure is automatically supplied to absorb water. The supply of a strong solution is accomplished by the application of steam from a gas-fired boiler to the solution concentrator. The gas boiler for supplying this steam of the concentrator is located outside the meter proving room.

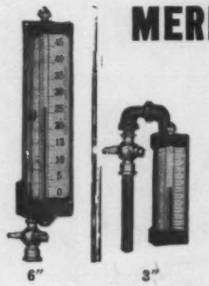
Concentrator Assembly

The concentrator assembly consists of a sump, a fan and filter assembly, and a steam heat exchanger. If dehumidification is required, the humidistat operates a steam valve to the heat exchanger over which lithium chloride is trickling and simultaneously a small fan circulates air in contact with the hot solution where vapor pressure has been increased. The solution gives up its water to the air, which has a lower vapor pressure and which is exhausted as moisture-laden air to the flue. The solution now has been strengthened and returns to the sump. From the sump a pump circulates the strong solution through a cooling surface to the air contactor.

As soon as the humidistat is satisfied, the steam valve closes and the concentrator fan stops; but the flow of solution in contact with the air to be treated remains constant.

If, however, humidification is required, a second humidistat set slightly below desired room conditions opens a water valve at the sump, diluting the solution so that a dilute solution of high vapor pressure is supplied to the air contractor, thus humidifying instead of dehumidifying.

The controls, in addition to the two humidistats, consists of two thermo-



6" 3"

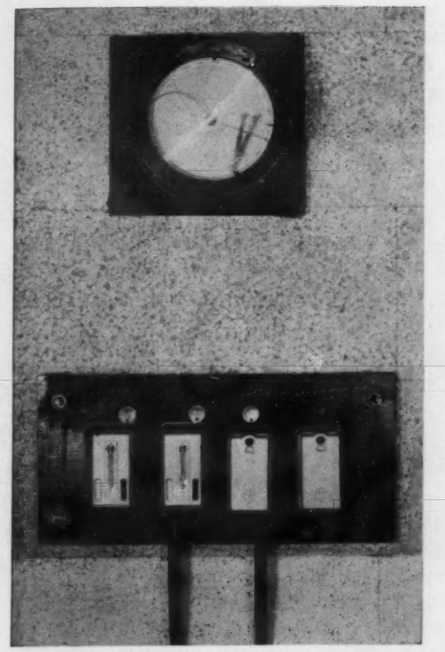
MERIAM MERCURY PRESSURE GAUGES

For the Gas Industry

These convenient instruments are receiving wide use in the gas industry for accurately determining gas pressures. Gauge bodies are ruggedly constructed of cast semi-steel. A built-in seal prevents spilling of mercury. These gauges are ideal for portable testing and are equally serviceable when permanently installed. Mercury furnished—simply connect, check zero level, and read ounces of pressure.

Write for complete information and prices.

THE MERIAM CO. 1955 W. 112TH ST., CLEVELAND, OHIO



Humidstat and Thermostat controls used in Sprague Meter's new proving room.

stats, one set slightly higher than desired room conditions and controlling a cold water valve to the water coil and the other set slightly lower than desired room conditions and controlling a steam valve to the steam coil. Thus heating or cooling may be obtained as required.

With the controls as outlined for heating and cooling, and the flexibility of the lithium chloride cycle, a remarkable close control of condition is possible. Further, as each function is under individual control, automatic shift over to any particular condition desired within the range of the equipment is possible.

The gas boiler is tied in with the system to take care of the requirements of steam for both summer and winter.

A particular feature of the system is of course its flexibility—i. e., automatic shift from summer to winter and vice versa, with or without manual resetting of control instruments. Furthermore—though only partly demonstrated on this job, The Sprague Meter Co., states—the concentrator and boiler may be located at any point from the air conditioner, inasmuch as the mediums of transfer are steam and lithium chloride in solution form.

■ ■

Revamp Corpus Christi Lines

The city gas distribution system of Corpus Christi, Texas, will be overhauled with part of the funds from the sale of revenue warrants in an amount from $400,000 to $750,000, recently approved by the city council.

Harry Prowell Reads Paper At S. C. M. A. Meeting

The Southern California Meter Association held its September meeting on September 23 at the Van Matre Inn, Huntington Park. Feature of the meeting which followed dinner was a paper by Harry Prowell, sales engineer, Taylor Instrument Companies, on "Temperature Measurement as Applied in Gas Transmission Pipe Lines." Mr. Prowell's discussion included data as to different methods used and the importance of temperature measurement in transmission lines as applied to orifice meter measurement. The speaker covered ordinary temperatures taken by thermometer and the more modern method of measuring these temperatures with recording instruments.

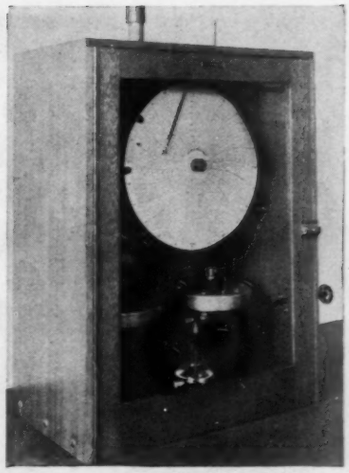
Johnny Reilly, noted swimmer, just returned from an A. A. U. swimming meet, talked on some of his experiences.

Entertainment was furnished through the courtesy of Taylor Instrument Companies.

■ ■

Dresser Promotes Shelgren

W. L. Shelgren, according to announcement from S. R. Dresser Manufacturing Co. of Bradford, Pa., is now their sales representative for the State of Michigan (except Detroit), the appointment becoming effective August 1. Mr. Shelgren has been with the Dresser Co., manufacturers of a complete line of flexible pipe couplings and pipe-line repair devices, for eleven years. His headquarters will be at the home office in Bradford, Pa.

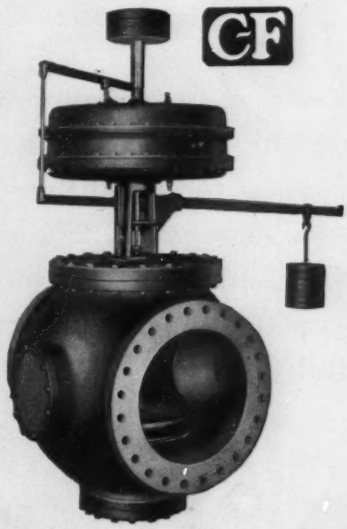


The ANUBIS Recording Gas Gravitometer

is a direct-weighing instrument that produces a highly accurate, temperature-compensated record of the specific gravity of gases. No electric motors or other mechanical complexities are used. The chart record reads direct to the second, and by easy and very close approximation, to the third place of decimals. A free bulletin giving all details awaits your request.

AMERICAN RECORDING CHART CO.
428 Boyd St. Los Angeles, Calif.

A PRODUCT OF FORTY YEARS' EXPERIENCE



Fulton Duplex Sensitive Gas Governor Provides:

1. Extremely accurate control of either natural or manufactured gas. Reduction of frictional surfaces, and extraordinary enlargement of diaphragm area gives assured delicacy of operation.

2. Immunity of regulator to chemical action of manufactured gases.

3. Easy, quick installation. No troublesome accessories.

Write for Bulletin 1142, which gives complete description.

THE CHAPLIN-FULTON MFG. COMPANY
28-40 Penn Avenue Pittsburgh, Pa.

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JNO. W. CRAWFORD *Sales Engineer* 1855 Industrial Street, Los Angeles
PARSONS ENGINEERING CO. Los Angeles, Calif. San Francisco, Calif.
OR ANY JOBBER

MORE READERS MORE ADVERTISING GAINED BY GAS

IN THE FIRST 6 MONTHS OF 1937 THAN BY BOTH OTHER GAS MAGAZINES COMBINED

CIRCULATION RECORD

6 Months

GAS .....gained 108 subscribers
Amer. Gas Jnl. gained 32 subscribers
Gas Age .....*lost* 626 subscribers

(Above figures from ABC Publishers Reports of June 30, 1937 as compared with those of Dec. 31, 1936.)

ADVERTISING RECORD

6 Months

GAS .....gained 76 pages
Amer. Gas Jnl. gained 45 pages
Gas Age.....gained 8 pages

(Advertising gains for the first 6 months of 1937 as compared with advertising for the same period in 1936.)

CONSISTENT gains in Advertising and Circulation mean that GAS not only covers the *Natural* Gas market editorially but that its advertisers have found it the most effective medium for reaching *Natural* Gas appliance and equipment buyers. Revenues of the Natural Gas Industry increased 7.2% over a year ago. If you want your Sales Messages to reach the richest, fastest-growing section of the Gas Industry, you want the magazine that *covers* this market, the *only* magazine edited and published exclusively for the Natural Gas man.

ABP GAS MEMBER AUDIT BUREAU OF CIRCULATIONS

LOS ANGELES
810 S. Spring St.

HOUSTON
306 Shell Bldg.

CHICAGO
Peoples Gas Bldg.

BUTANE-PROPANE NEWS

Carburizing Oil Well Equipment With Butane in a Dallas Plant

By R. F. FOSTER Sales Engineer, Lone Star Gas Company Stargas Department

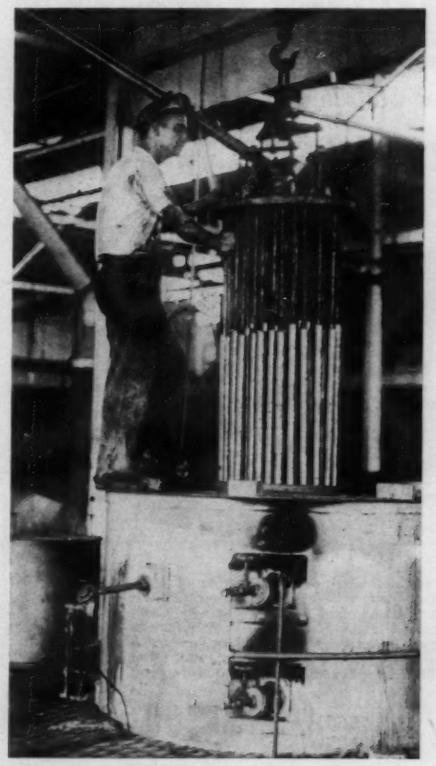
LONE Star Gas Co.'s commercial butane, called New Stargas, is being used by the D. & B. Pump Supply Co. of Dallas in carburizing couplings, pistons, plungers, and other oil-well pumping equipment. In this particular process, butane is preferred because its carbon content does not vary.

The carburizing furnace consists of a retort, 24-in. in diameter by 82-in. deep, made of high quality chromium nickel alloy surrounded by a firebrick wall 18-in. thick. Through the furnace wall and located 90 degrees apart—equally spaced up and down the retort—are installed sixteen ½-in. high pressure natural gas burners. Butane is piped into the bottom of the retort, coming up through holes of a perforated distributor plate which gives an even distribution of the gas inside the retort. The furnace extends about 6 ft. under the floor and about 2½ ft. above the floor.

The capacity of this retort is approximately two tons, which in number of pieces is 1,300 1⅝-in. or 1 13/16-in. sucker rod couplings. The couplings are slipped over removable rods that are attached to the cover plate of the retort. The spacing is such that all the outside surface of each piece to be carburized is exposed to the atmosphere inside the retort. The cover plate and "charge" are handled with a power-driven hoist.

When the "charge" is lowered into place, the cover plate of the retort rests securely on the shell of the retort and is sealed with a paste made of fireclay. The retort and "charge" are now preheated by the 16-in. high pressure natural gas burners to 1,750° F. This preheating requires about five hours with all 16 burners wide open. The temperature is maintained constant by means of a recording temperature controller, two thermocouples being located near the bottom and top of the retort.

When 1,750° F. is reached, butane is turned into the retort. At this temperature, butane ($C_4 H_{10}$) breaks down into carbon and hydrogen. The carbon in the form of soot surrounds the pieces to be carburized and increases the carbon content of the steel about 1/16-in. in depth. The liberated hydrogen is piped off from the center of the cover plate and burned.



The operator lowers a "charge" of couplings into the retort to be carburized. The two burners in the lower foreground are natural gas burners to heat the furnace and retort. Butane for carburizing is introduced into the bottom of the retort.

This process continues for nine hours with the temperature of the retort being held constant at 1,750° F.

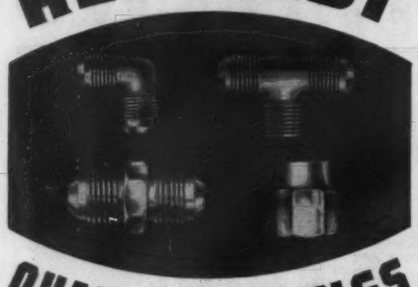
Another 10-hour period is required for the furnace and "charge" to cool down. Each "string" of carburized pieces is removed from the cover plate and cleaned of all excess carbon by means of a motor-driven wire brush. A suction fan attached to the brush discharges all carbon outside the plant building.

After cleaning, the pieces are machined to the proper dimensions. They are then hardened by heating and then cooled rapidly in an oil bath Due to the quantity of the pieces hardened, the oil in the bath must be cooled by circulating over a cooling tower. This maintains the oil in the bath at about 125° F. which is cool enough properly to harden the carburized pieces.

The pieces are now ground to exact size and sent to the assembly or stock room as finished hardened oil well pump parts. Sample pieces of each "charge" are tested with an etching reagent to determine the depth of penetration of the hardening. All pieces receive 1/16-in. penetration, with practically no variation within a "charge" or from one "charge" to another.

During the carburizing period, butane passes into the retort at the rate of about 50 cu. ft. per hour. One charge requires about 15 gals. of butane, which is drawn off the butane tank and used in vapor form. A standard 250-gal. butane evaporator (New Stargas Unit) is used to supply service and is filled by the regular butane delivery truck every month or five weeks. Three "charges" are carburized each week, making an output through the one furnace of about 25 tons of carburized pump parts each month.

KEROTEST



QUALITY FITTINGS

for every propane gas installation

Kerotest Fittings of heavy design are the work of master craftsmen and comprise a complete line of S.A.E. flare crosses, tees, elbows, unions, and nuts for your copper tube installations of propane gas.

Each one is individually inspected to insure smooth, finished seats and clean-cut threads — then individually protected by cardboard ferrules and carefully packed in strong, iron bound boxes,—your assurance of receiving them in factory-perfect condition.

KEROTEST MANUFACTURING COMPANY
PITTSBURGH, PA.

Minngas Co. Starting Propane Service To 90 Towns Near Tracy, Minn.

Ninety towns in Minnesota within a 50-mile radius of Tracy will be served with propane gas by Minngas Co., a new corporation which is constructing a modern building in Tracy to house its display room and general offices, acording to announcement by H. H. Henley, president. Service will probably be available about October 15. A service plan requiring no initial investment by the customer has been adopted.

Minngas Co. has acquired franchises from Liquefied Natural Gas Corp. in Tracy, Lamberton, Sanborn, Currie, Jeffers, Butterfield, and Comfrey. A bulk storage plant will be installed in Tracy, which will be the distributing point for the company's service.

In Tracy, Mr. Henley states, some mains will be installed, depending upon the location and grouping of customers. In surrounding territory, gas will be supplied by truck service to permanently located tanks. In some cases tanks will be installed for individual service, but whenever customers are located to permit economical grouping, larger permantly located tanks will be installed and customers served from them.

The service plan, which eliminates initial investment on the part of the customer, is explained by Mr. Henley as follows:

Customers will be required to enter into a lease agreement with the company covering tanks, valves, service connection, regulators, meters, and all other appurtenances for bringing gas into the customer's basement, ready for the attachment of applicanes. Monthly rental is 75 cents.

Minngas Co. will furnish and install all gas appliances for domestic service on a rental basis. Purchase of appliances will be optional with the customer.

Propane gas will be sold on a public utility basis by the cubic foot, through meters. Meters will be used to read in 530 B.t.u. equivalent.

Gas rates, based on 530 B.t.u. equivalent, are as follows:

First 1,000 cu. ft. used monthly	$1.75
Next 1,000 cu. ft. used monthly	1.50
Next 1,000 cu. ft. used monthly	1.25
Over 3,000 cu. ft. used monthly	1.00

No cash discounts and no minimum will be allowed.

Incorporators of Minngas Co. include a number of business men of Wahpeton, N. D., who have been using undiluted propane gas service for approximately six years from a plant which Mr. Henley, president of Minngas Co., designed and installed.

■ ■

Daily Butane-Propane Yield in East Texas Is 200,000 Gals.

Approximately 200,000 gallons of butane-propane pressure fuel are produced daily in the East Texas field, according to the June report of the Railroad Commission of Texas. The field is capable of much greater production of butane-propane, the report states, as large plants become equipped for the purpose. The Commission prophesies that the field will continue to be a prolific producer for a long time to come.

A pipe line carries the product from the East Texas field to a refinery on the Gulf Coast, the report continues, where it is put through a high pressure, high temperature polymerization process, which reforms its molecular structure to a product with a higher temperature boiling range, thereby making it available as a motor fuel of high octane rating.

■ ■

N. B. G. A. Meets Sept. 28

National Bottled Gas Association will hold a general meeting in Cleveland, Ohio, on September 28, during the national convention of the American Gas Association. According to F. R. Fetherston, the meeting place will be Hotel Cleveland, Rooms 29 and 31, and the time, 10 a. m.

■ ■

Ohio Firm Produces Propane

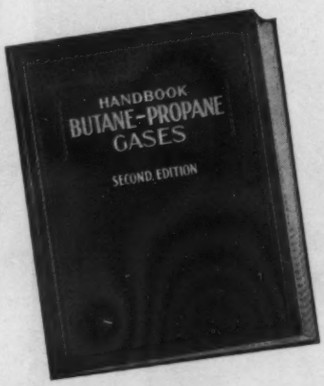
The Burdett Oxygen Co., Cleveland, Ohio, recently began production of propane after completion of an addition to its plant on Bradley Road. The company also has four plants for liquefying oxygen, and a plant for production of acetylene.

The SUPPLEMENT to the Handbook Butane-Propane Gases (2nd edition)..

1.00 Per Copy

A record of the past two years of progress in the *Liquefied Petroleum Gas Industry* published March 1937

HANDBOOK
BUTANE
PROPANE
GASES



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375 pages

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GAS
The NATURAL Gas Magazine

810 S. Spring St.
Los Angeles, Calif.

Tide Water Refinery at Avon Uses Girbotol Process

IN connection with the ploymerization plant to be built at their Avon, Calif. refinery, engineers of the Tide Water Associated Oil Co. have selected the Girbotol process for the removal of hydrogen sulphide.

This process, developed and owned by the Girdler Corp. of Louisville, Ky., removes hydrogen sulphide from the refinery gases before polymerization. Such prior treatment of the poly charge, the company states, makes unnecessary an after-treatment of the poly product to remove objectionable sulphur compounds. Not only is this after-treatment more costly, according to the company, but it also reduces the octane number and blending value of the finished product.

Another important factor influencing Tide Water engineers is the material reduction of internal corrosion of plant equipment which, the Girdler Co. states, is brought about by removing the hydrogen sulphide before passing the gases through the polymerization plant.

■ ■

F. T. Carpenter Joins Philgas Department's Detroit Staff

Philgas Department of Phillips Petroleum Co., marketers of liquefied petroleum gases for domestic, industrial, gas manufacturing, and sundry uses, announces the recent addition to its Detroit office staff of F. T. Carpenter.

Mr. Carpenter, a graduate of Drake University in 1921, had his early training in the gas business under his father, superintendent of a manufactured gas plant in Iowa. For many years Mr. Carpenter was associated with the American Gas Construction Co. and its successor, the C. I. Tenney Engineering Co., as superintendent of construction. While with this organization, Mr. Carpenter was in charge of building many water gas, natural gas, and liquefied petroleum gas plants and distribution systems throughout the United States.

■ ■

Radio Program Sponsored By Dealers, United Gas Corp.

Gas appliance dealers of Houston, Texas, are joining with United Gas Corp., in a year's radio broadcasting program that will carry a gas-appliance message 22 times a day over KPRC. A 15-word message will be announced in connection with the time signal, which is given every half-hour between 6:30 a. m. and 6 p. m. Each announcement names one of the 11 dealers from whom the appliance mentioned can be purchased.

■ ■

Bottled Gas Production Falls

Daily average production of liquefied petroleum gases in the Pacific Coast territory decreased in July from 1,925 barrels to 1,867 barrels, according to a statement issued by the Petroleum Economics Division of the U. S. Bureau of Mines. Of the July production, 468 barrels were produced at refineries. Daily average sales decreased from 1,987 barrels to 1,930 barrels.

DEPENDABILITY IS ASSURED by HACKNEY PRECISION MANUFACTURING

The gas industry has, for many years, recognized the value of Hackney dependability. In every detail of construction Hackney cylinders are built for economy and service. The uniformity of wall thickness of Hackney cylinders provides uniform strength at all points. Their uniform capacity and weight assure economy and satisfactory performance.

Write today for complete information about Hackney cylinders for Propane, Butane and Butane-Propane mixtures—there is no obligation.

Hackney MILWAUKEE

PRESSED STEEL TANK COMPANY

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666 Roosevelt Building, Los Angeles
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Containers for Gases, Liquids and Solids

U. S. SUPER de LAVAUD CAST IRON PIPE

"Cast without chill in a metal mold"

U. S. PIPE AND FOUNDRY COMPANY
Burlington, N. J.

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Standard Oil Co., Bayonne, N. J.
Pioneer Division, Flintkote Co., Los Angeles, Calif.
National Republic Bank Bldg., Chicago.
Houston (Texas) Paper Stock Co.
Whittier School, Austin, Minn.
Columbia Steel Co., Torrance, Calif.
Washington-Youree Hotel Co., Shreveport, La.
American Crystal Sugar Co., Grand Island, Nebr.
Abasand Oil Ltd., Waterways, Canada.
Carnegie Illinois Steel Corp., Gary, Ind.
Stevens Hotel, Chicago, Ill.
And Many More

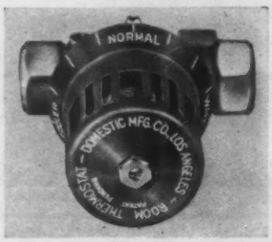
There IS a difference in gas burners. The METTLER has been recognized as scientifically correct for 15 years.

At the new low prices you can now recommend replacing obsolete and inferior equipment with this popular, outstanding burner, thus eliminating complaints and service calls.

LEE B. METTLER CO.
406 S. Main St., Los Angeles, California
Chicago Office
Peoples Gas Building

YOUR Console Heater SALES Will PROFIT

by the Domestic Room Thermostat



The public is demanding automatic heating. And when a console heater is equipped with a Domestic Room Thermostat to deliver constant automatic heat, it becomes much more saleable merchandise.

The Domestic Room Thermostat is easily installed on the line ahead of the heater. Already many lines of console heaters come factory equipped with the Domestic Room Thermostat. It will pay you to investigate.

Domestic Manufacturing Co.
700 East Florence Ave. Los Angeles, Calif.

The new office of Automatic Gas Co. at Tyler, Texas, and one of the company's four trucks.

Automatic Gas Co. Opens Show Room and Assembly Plant at Tyler, Tex.

WITH approximately 800 customers in 70 counties in east Texas, Automatic Gas Co., Inc., recently opened a new office, show room, and assembly plant in Tyler, Texas. The company, which distributes isobutane and sells appliances, will complete its second year of business on October 4. It installs about 40 systems a month, according to H. C. Pittman, president.

Underground tanks, developed by company engineers and Mr. Pittman, are maintained by Automatic Gas Co. gallon sizes. Special features have been incorporated in the fittings inside and outside the dry gas chamber dome, according to Mr. Pittman. The company is listed with Underwriters' Laboratories, Inc. The tanks are manufactured by the Mosher Steel Co., Houston, and are assembled at the Automatic Gas Co.'s plant in Tyler. Dealers to handle these tanks in distant territories have recently been appointed.

Branch offices and service stations are maintaned by Automatic Gas Co. at Madisonville, Longview, Sulphur Springs, Mt. Pleasant, and Canton, all in Texas.

Customers' tanks are serviced by four 1000-gallon fuel trucks covering regular monthly routes. The price is 10 cents per gallon within a radius of 100 miles of Tyler. Thirty-six salesmen cover the territory in a systematic manner.

Automatic Gas Co. has leased equipment with Warren Petroleum Co. at Turnertown, 30 miles from Tyler in the East Texas oil field, and hauls its iso-butane from there. The company also sells wholesale to other butane dealers in territories from 130 to 150 miles distant.

Appliances sold include refrigerators, ranges, floor furnaces, radiant heaters, circulating heaters, water heaters, and light fixtures.

■ ■

New Mexico Gas Co. Builds Two Bypass Lines

Two bypass lines have been completed by New Mexico Gas Co. near Santa Fe, N.M., as the result of washouts on the Santa Fe 8-inch main line, according to J. H. Wilson, district manager. For emergency use, in case the line at the Galisteo Crossing is washed out, the company built a 4-inch bypass to the Galisteo highway bridge and laid the line over the bridge. Length of the bypass is approximately 4,000 feet.

At the Hagen Crossing, about 30 miles west of Santa Fe, the company laid a bypass over the bridge, fastening the line to the bridge in loops to allow for expansion and contraction.

■ ■

Art Concrete Head Scouts New Plant Locations in South

Art Concrete's Frank M. Brooks will make a tour of the company's plants in Birmingham, Alabama and Jacksonville, Florida, after attending the American Gas Association convention in Cleveland.

Mr. Brooks, who is general manager of the Art Concrete Works of Pasadena, Calif., manufacturers of curb meter boxes, will also survey the possibilities for the establishment of two new plants in the southern states.

■ ■

United Gas Modernizes Office

United Gas Public Service Co. recently opened new, modern offices in Abbeville, La., necessitated by the expansion in business since the company introduced natural gas in the community in 1931.

Oklahoma Natural Adds Four To Home Service Staff

INCREASING popularity of Home Service work in Oklahoma Natural Gas Co. territory has necessitated enlarging the staff, according to an announcement by Mildred R. Clark, home service supervisor for the company. New staff members, all of whom are home economics graduates, include Miss Pauline Sherwood and Miss Sarah Garrison of Kansas State College; Miss Ruth Owen, Oklahoma University; and Miss Mary Frances Reece, Texas State College for Women.

A two weeks' training course was held for the new staff members. At its close, the entire staff was called into Tulsa headquarters to plan the next year's work.

The intensive training course included not only specific training in home service work, but training in all phases of the company's operations, which was presented by heads of various departments.

Oklahoma Natural's Home Service program includes an extensive home-call and demonstration program in a dealer co-operative plan, as well as supervision of four model kitchens and auditoriums for the use of the public. The program also includes kitchen planning, preparation of news for forty newspapers and sales promotion activities throughout the sixty towns served by the company.

■ ■

Cleveland Co-operative Stove Buys Sherman Stove Co.

Acquisition of the Sherman Stove Co. by the Cleveland Co-Operative Stove Co. is announced by James Mitchell, president of the Cleveland concern. No definite plans for the future of the Sherman Stove Co. beyond the current year are yet formulated, according to Mr. Mitchell.

Production of current gas ranges will go forward in the Cleveland Co-Operative Stove Co.'s No. 1 plant. Management of the Sherman division will be assumed by the officers and department heads of the Cleveland company, but for the most part Sherman dealers will continue to be contacted by the Sherman field organizations.

There will be no change in Sherman models for the balance of the year.

■ ■

Hearing on Accounting

Uniformity in accounting for gas utilities was the subject of a recent hearing by the West Virginia Public Service Commission. The Commission is considering the advisability of prescribing the accounting system, with any necessary modifications, prepared for gas utilities, classes A and B, by the National Association of Railroad and Utilities Commissioners.

■ ■

Louisville Flood Story Told

How the Louisville Gas and Electric Co. met the flood crisis of last January is told in a memorial edition of the *Synchronizer*, monthly magazine issued for employees of the Kentucky utility. The magazine reproduces many pictures taken during the emergency.

- FORCED AIR-HEATING AND VENTILATING UNITS
- BASEMENT GRAVITY AND BLOWER FURNACES
- GAS STEAM RADIATORS
- CIRCULATORS
- WALL HEATERS
- RADIANT HEATERS
- BLOWERS
- WATER HEATERS

Every furnace bearing the Pacific name is equipped with the famous Multi-Tubular Burner — developed originally by Pacific and for many years an exclusive Pacific feature.

It consists of several individual burner units, each with its own gas and air intake. There are no adjustable air mixers—each unit is permanently adjusted at the factory for perfect combustion. In repeated tests the Multi-Tubular Burner delivers 10% to 15% more heat for the same amount of fuel. Yet Pacific Furnaces, with all their efficiency and safety features, cost no more. We have some attractive territories open. Write for Catalog G-10.

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THERMO ELECTRIC SAFETY CONTROL FOR GAS BURNING APPLIANCES
BOILERS ★ FURNACES ★ CONV. BURNERS ★ SPACE HEATERS ★ UNIT HEATERS ★ AIR CONDITIONERS OVENS ★ RANGES ★ WATER HEATERS, ETC.
MILWAUKEE GAS SPECIALTY CO.
MILWAUKEE ★ WISCONSIN
GAS VALVE SERIES 500
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HOTEL
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Famous for Good Food from Coast to Coast

RIGHT down-town in the center of things. Easy chairs, sleep-inspiring beds, large rooms with luxurious fittings.

P. G. B. MORRISS
Manager

Concerning Gas Scrubbing

(Continued from Page 29)

resistance of one of the films is negligible. When this is true the considerations are greatly simplified. For instance, in Fig. 1, if the hot fluid is condensing steam and the cold fluid a viscous oil, then the heat transfer coefficient on the steam side will be so high that it will be negligible and practically all of the resistance and hence all the temperature gradient will be in the oil film and the apparatus can be considered as having only a single resisting film. Similarly in gas absorption where there is a very soluble gas, there is often a negligible resistance in the liquid film, so nearly all the resistance resides in the gas film. This is approximately true for the absorption of ammonia in water. Since H_2S and CO_2 are highly soluble in soda ash solutions, it might be expected that these would be cases where practically all the resistance is in the gas film. However, this supposition has been shown to be untrue, for the absorption in the liquid phase is by means of a relatively slow chemical reaction, the formation of the bicarbonate, and a good part of the resistance thus resides in the liquid phase. This is shown by the data of Fig. 3 which are the results of a test run on the absorber of the liquid purification plant of the Connecticut Coke Co. The active volume of the grid-packed tower was 20,500 cu. ft., the grid surface, 118,000 sq. ft. It will be seen that the rate of liquor flow had considerable effect on the over-all coefficient of transfer, and particularly at the higher liquor rate, the gas flow also had a pronounced effect. This shows that both liquid and gas films are important in this transfer. These data are not sufficiently complete or reproducible to permit the calculation of the individual transfer coefficient. However, where satisfactory data are available the transfer coefficients k_g and k_l of the gas and liquid films respectively, can be computed from the general relation, where

$$\frac{1}{k_o} = \frac{1}{k_g} + \frac{1}{k_l} \qquad (2)$$

k_o = the overall transfer coefficient as determined in the apparatus.

The coefficients of transfer are computed from data of flow quantities and analysis of the entrance and exit fluids. Since the operation is considered as analogous to heat transfer it is necessary to use the logarithmic mean for the determination of the average partial pressure difference between the phases.

The logarithmic mean is defined as:

$$\Delta P_m = \frac{\Delta P_1 - \Delta P_2}{2.3 \log_{10} \frac{\Delta P_1}{\Delta P_2}} \qquad (3)$$

where ΔP_1 and ΔP_2 refer to the partial pressure differences between the two phases at opposite ends of the apparatus. The partial pressure over the liquid can usually be determined by analyzing a sample of gas over a sample of liquid which has been vigorously shaken in a bottle.

The utility of these absorption coefficients lies in transferring experience from one operation to another. If coefficients are determined for pilot plant equipment with a given packing they can be used to compute the size of large apparatus necessary

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1700 ROOMS
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HOME OF THE COLLEGE INN
FRANKIE MASTERS His Radio Orchestra
JACKIE HELLER – Popular N.B.C. Singing Star
CHICAGO

YOU CAN DRIVE YOUR CAR RIGHT INTO HOTEL SHERMAN ★★★

to do a given job of transferring with given terminal conditions. Using equation (1), they can be used to determine beforehand the effect of a change in the rate of through-put of either phase, if the effect of rate of flow upon the coefficient is known from experiment. For instance, if it is known that the resistance to transfer for a given system is all in the liquid film, it will be known that increasing or decreasing the rate of gas flow will have a negligible effect on the amount of material absorbed. However, the amount absorbed will be markedly affected by the liquid flow. Usually the coefficient varies about as the 0.8 power of the velocity, so if the liquid flow through the apparatus were doubled the coefficient would increase about 75 per cent. Then if terminal concentration conditions were kept the same as before. the amount absorbed per unit of time would be increased about 75%.

The principles of stripping or desorption are the same as those of absorption except the process is in the reverse direction, the material leaves the liquid phase and passes into the gas. There are two ways of bringing this about. In the liquid purification system for removing H_2S, the soda ash foul solution containing H_2S is passed down a packed tower countercurrent to a stream of air. The partial pressure of H_2S in the air is less than that over the solution, so the H_2S passes out of the liquid into the air. The coefficient of desorption in this case is about the same as for absorption. The other method of stripping is to raise the temperature of the liquid and thus raise the partial pressure of the material to be stripped out. This is exemplified by the removal of benzene by blowing steam through a scrubbing oil; the steam raises the temperature and also acts as a carrier gas to take the benzene away, but the principles are the same in either case: the substance moves out the liquid because its partial pressure there is higher than in the gas phase. The coefficients of desorption are measurable and can be used to compute size and performance of apparatus just as for absorption.

■ ■

Howard Supply Co. Formed

Howard Supply Co., Los Angeles, Calif., has been formed to handle sales of national brands of equipment for the gas and oil industry, including products of Republic Steel Corp. and other well-known lines. Announcement of the new company was made by the president and organizer, Harold Howard, formerly general manager of Ducommun Metals & Supply Co., Los Angeles. Other officers are George Trembly, vice-president and Arthur G. Moyer, secretary-treasurer.

EXPERIENCE *plus* EQUIPMENT

Means Better Pipelines

A Foreground of Experience—A Background of Equipment.

We have just completed the laying of 151 miles of 24-inch line for the Panhandle Eastern Pipe Line Company in the State of Kansas.

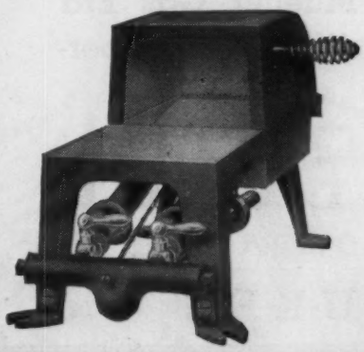
The test will speak for itself — Ask the Owner!

"When You Want Better Pipe Lines Built Let Tom Jones Build Them"

T. R. Jones, Inc.

Magnolia Building **Dallas, Texas**

JOHNSON NO. 502 SOLDERING FURNACE



This popular Johnson furnace is designed to heat soldering coppers up to 12 lbs. per pair and can also be successfully used for heat-treating of small parts and metal melting. The hinged, curved-shaped hood can be instantly removed. No forced air blast required. Base is lined with fire-brick. Fired by two Johnson Bunsen Burners, each with pilot light and shut-off valve. Very economical to operate.

Write for free catalog.

JOHNSON GAS APPLIANCE CO. Cedar Rapids IOWA

Water Circulator Announced By Minneapolis-Honeywell

The Minneapolis-Honeywell Regulator Co. has introduced a new water circulator, packless sealed and precision built. It is used to speed up circulation on hot water heating systems. It may be used alone for this purpose, or in conjunction with a Minneapolis-Honeywell flow valve to provide fully automatic summer-winter hot water control.

The company states that the new water circulator is quiet in operation, leak-proof, standard with built-in thermal overload cut-out; high powered; has a high starting torque; requires only low starting current; offers no radio interference; is designed to provide maximum capacity at minimum wattage input; has stainless steel drive shaft and bearings of high-grade bronze; is scientifically lubricated to insure trouble-free performance, the company says.

The circulator is offered in sizes to fit 1-in., 1½-in., 2-in. and 3-in. pipe mains. Although 110 volts, 60-cycle motors are standard, the circulator is available for 220 volts, 60 cycles and 110 or 220 volts, 25, 30, 40, or 50 cycles, or for 115 or 230 volts D.C.

■ ■

Klixon Thermostat Controls Described in New Catalog

A new 48-page catalog showing the full line of Klixon thermostatic controls has just been released by Spencer Thermostat Co., Attleboro, Mass.

Included in this catalog are gas and electric actuated controls for heating appliances, room thermostats, limit controls for steam, hot water, and warm air heating systems, stoker timers, thermal relays, and self-closing temperature and pressure relief valves for hot water supply systems. Mounting accessories offering flexibility in the application of these controls are also shown.

The unique feature of the Klixon controls listed in the new catalog, according to the manufacturer, is their inherent snap-acting operation, which is made possible by the use of the Spencer thermostatic disc as the thermal element.

A free copy of the catalog may be obtained by writing to the Spencer factory in Attleboro.

■ ■

Union Light Lays 30-in. Main

Union Light, Heat & Power Co., Cincinnati, Ohio, is laying nearly a mile of 30-inch gas main in the city, necessitated by construction and rebuilding involved in the new Third street viaduct.

Canadian Auto Court Installs Gas for Cooking, Heating

THE new Craigflower Auto Court on Victoria Island, British Columbia, Canada, has installed gas for cooking, space heating, and water heating in twelve duplex-type bungalows, the manager's apartment, and the camp store. The court is located at the end of the Craigflower bridge.

Each kitchen in the 24 suites is equipped with a Magic Chef gas range according to S. W. Mackintosh of the British Columbia Electric Railway Co., Ltd. Every bedroom has a No. 20 Humphrey gas fire and each living room a No. 31 Humphrey.

The camp store and the manager's apartment are gas heated and air-conditioned by a Pacific forced-air unit. The manager's kitchen also has a Magic Chef range.

Hot water is piped to each suite. It is heated by a Bryant gas-fired boiler, states Mr. Mackintosh. Unused hot water is returned to a 500-gallon storage tank by means of an electrically driven circulator. Contents of the tank, which is lagged, is maintained at a constant temperature by thermostat control.

■ ■

New Bonney Forge Bulletin On Pipe Fittings

Bonney Forge & Tool Works, Forged Fittings Division, Allentown, Pa., has just issued Bulletin WT23, illustrating and describing WeldOlets and Thred-Olets, the patented, drop-forged pipe fittings for making branch pipe connections by welding.

The manufacturer claims that by using these fittings, branch lines may be taken off the main pipe without any cutting, threading or fitting of the main line, either before or after it is in position. The company further states that no special training is needed for their installation, that any welder of average experience can do a first-class job with the assurance of obtaining leak-proof joints.

They are suitable, according to the manufacturer, for use in all types of piping installations, either inside or out.

A copy of the bulletin will be mailed on request.

■ ■

Arkansas-Louisiana Gas Co. Begins Odorization

As its first step in compliance with the new Texas law making odorization of natural gas compulsory, Arkansas-Louisiana Gas Co. on August 27 began odorization in three of its Texas properties, Atlanta, Bloomburg, and Queen City, according to W. M. Little, superintendent of distribution.

Odorizing equipment of the absorption type is installed at the city gates.

Other Texas towns served by the company will follow as quickly as equipment can be assembled and its men properly trained in rendering this new service for the safety of the customer.

The Goodman Stopper

The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
475 Eleventh Street
San Francisco, California

EXCLUSIVE design of Mueller Gas Era Furnace gives longest life—lowest operating cost.

L. J. MUELLER
FURNACE COMPANY
MILWAUKEE

Welsbach Announces

SALES PROMOTION PLANS

Look for the plans at Cleveland Convention or write for details.

NOW AVAILABLE FOR 1938 PROGRAMS

WELSBACH COMPANY

Gloucester City, N. J.
San Francisco
Chicago

Welsbach PRODUCTS

RAIN

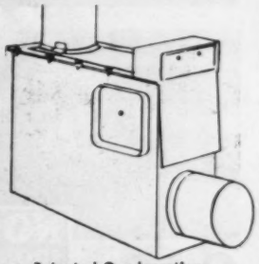
THE SIMPLEST FORM OF CONDENSATION

Is caused by a current of hot moisture-laden air striking a bank of cold air

So it is with a chimney. When acid bearing corrosive hot moist gases flow up a cold stack, moisture is formed, is absorbed, freezes and expands, and the process of chimney disintegration has a fine start.

Install the Condensation Eliminator to trap excessive moisture and line the chimney with Vitroliner, the Permanent Chimney Liner, to prevent costly repairs and ultimate stack replacement.

Vitroliner is coated both inside and out with a high grade acid resisting vitreous enamel. Bell and Spigott type joint assures uniform fit under all circumstances. It costs so little to preserve your chimney with Vitroliner.



Patented Condensation Eliminator

The largest utility companies of the Chicago area have standardized

VITROLINER the permanent Chimney Liner

Trade Mark

Please direct all Canadian inquiries to Condensation Engineering Corporation, of Canada, Ltd. Helena Bldg., King St., London, Ontario

Information and prices on an entire line of condensation equipment will be sent on request.

CONDENSATION ENGINEERING CORPORATION

TELEPHONE MONROE 1031

835 South Western Avenue, Chicago

NEW LOW COST
FRASER

Gas Furnace and Winter Air Conditioning System

Sensational in performance, low original cost and low operating cost.

Write for details today.

Manufactured by
Fraser Furnace Company
Stockton, Calif.

Distributed by
H. R. Basford Company
San Francisco Los Angeles

GAS LINE PROTECTION
The Modern Method

NO-OX-ID is applied by machine or hand methods as conditions require. The machine shown above is our stationary type. Below is the traveling type, which can be taken out on the job.

Dearborn Service Engineers will make soil surveys and give you scientifically correct recommendations on protection for pipe lines. Inquiries invited.

DEARBORN CHEMICAL COMPANY
310 S. Michigan Ave., Chicago
Los Angeles: 807 Mateo Street, Phone TRinity 3385
San Francisco: 421 Bryant Street, Phone SUtter 8688

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Gas air-conditioning plant in the office of Southern Counties Gas Co. at Pomona, Calif.

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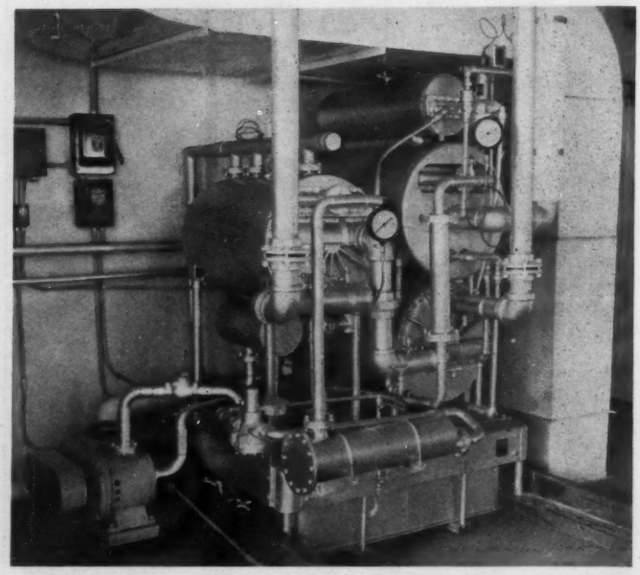


Pomona Office of Southern Counties Has New Air-Conditioning Plant

A NATURAL gas air-conditioning plant, the first of its kind west of Oklahoma, went into operation recently at the Southern Counties Gas Co. office building in Pomona, Calif. A second plant is being installed at the company's Santa Ana office building.

The Pomona plant combines summer cooling with winter heating in a single installation.

Manufactured by the Williams Oil-O-Matic Heating Corp,, Bloomington, Ill., the machine employs for the cooling system a type of refrigeration similar in principle to the Electrolux gas refrigerator. Controlled thermostatically to maintain a comfortable temperature at all times, the plant is capable of producing a differential of 10 to 15 degrees between inside and outside temperatures. Nominal capacity of the cooling system is 15 tons.

The plant also filters the air and removes excessive moisture. Positive forced ventilation sends a stream of cool, clean, dehumidified air through every room.

In winter, a low-pressure, gas-fired steam boiler furnishes steam for radiation and air tempering. The filtering and ventilating system operates in conjunction with the heating system as well, and it is expected that the gas company office building will be free from the California smudge nuisance even at its worst.

The ventilating mechanism may be operated alone in weather that requires only a relatively small lowering of inside temperature for comfort, and in the auditorium a constant temperature may be mantained automatically through ventilation alone during cold weather.

■ ■

Third Edition of A.G.A. Book On Kitchen Planning Ready

A third edition of *Modern Kitchens and Basements—A Handbook for Design and Construction*, containing new pictures and plans and other up-to-date material, has been issued by the Commercial Section of the American Gas Association. It is available to members of the American Gas Association at $1.35 a copy postpaid.

Included in the new material of this enlarged edition are 19 full-page illustrations of modern gas kitchens and basements. These are photographs of actual installations in gas companies. There are also 12 new floor and wall kitchen layouts in the pocket of the inside back cover.

■ ■

Consumers Gas Relays Line

Consumers Gas Co., Miami, Okla., is relaying its 16-in. line two miles north of Welch which supplies the mining field, Welch, and connects with Vinita. The lines have been taken out of the highway and new pipe laid on the property lines.

■ ■

Hanson Joins A. G. P. Firm

Frank E. Hanson, chief of the laboratory, The Boston (Mass.) Consolidated Gas Co., has joined the testing laboratory of American Gas Products Co., Mount Vernon, N. Y.

Hotstream Heater Announces New Safety Valve

THE Hotstream Heater Co., Cleveland, Ohio, announces its new 100% Safety Valve designed to insure safety in the use of water heaters burning liquefied petroleum gases.

The new valve, the company states, automatically cuts off all supply of gas to both the pilot and the main burner instead of merely to the main burner.

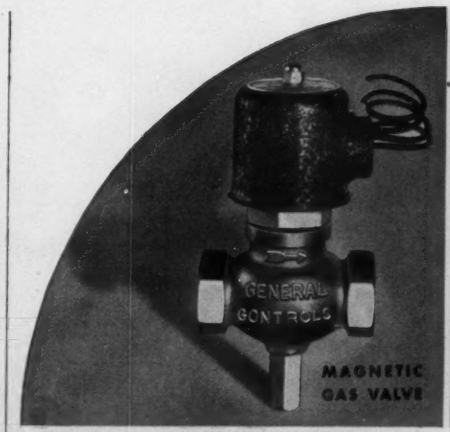
This eliminates the dangerous condition that would be created if bottled gas leading from the pilot were allowed to accumulate in the bottom of the heater. In heaters using regular gases, the small amount of gas consumed by the ordinary safety pilot flame escapes through the heater flue. The 100% Safety Valve can be used equally well with such heaters, according to the Hotstream Heater Co., to eliminate gas leakage.

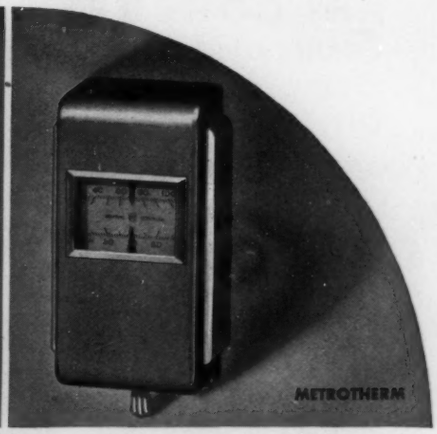
No. 4150-SP Safety Pilot with pilot attachment is for use with automatic heaters. No. 4180-SP Safety Shut-off without pilot or trigger attachment is for use with manually and semi-automatically controlled heaters.

■ ■

Pipe Repair Handbook Ready

Engineers, superintendents and maintenance men responsible for pipe line maintenance will be interested in the new "Pipe Repair Handbook" published by M. B. Skinner Co., South Bend, Ind. It discusses various kinds of leaks in pipe lines, and joints of various kinds, disclosing how repairs may be made without service interruption. The Handbook is furnished without cost to men responsible for pipe maintenance.





GAS CONTROLS
DOMESTIC & INDUSTRIAL

A complete line of magnetic gas valves and room thermostats manufactured by the originators of the Quiet A.C. Solenoid. Each control is the creation of a staff of engineers working endlessly to develop and painstakingly to perfect the most efficient control for each job to be done.

GENERAL CONTROLS

NEW YORK • CLEVELAND
KANSAS CITY • SAN FRANCISCO

Announcing
ENSIGN'S FACTORY BRANCH AT DALLAS
TO BETTER SERVE YOUR NEEDS

Ensign fine precision carburetting and fuel regulating equipment is manufactured in various types for using Natural Gas, Gasoline, Butane, and both gas and gasoline in combination.

To meet the growing requirements of the various Texas, Mid-Continent and Gulf Coast oil fields, Ensign has established its new factory branch at Dallas, where complete stocks of all sizes of Ensign equipment in complete assembled units or single replacement parts can be secured without delay.

ENSIGN CARBURETOR CO., Ltd.
HUNTINGTON PARK • CALIFORNIA
Branches: Chicago, Illinois; Dallas, Texas

ART CONCRETE
Sectional Meter Boxes
Complete Protection for CURB METERS

Thousands in Use

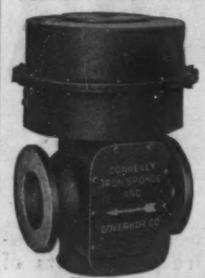
Furnished in combinations suitable for single and multiple set-ups, high and low pressure. **Special features: 1—Sections resist displacement when installed and are securely locked together by concealed rods. 2—Boxes may be lengthened without removal. 3—Knock-outs are provided for pipe connections.** . . . We also furnish curb valve boxes with break-away pipe slots and grooves for varying depths.

Originators and Manufacturers

ART CONCRETE WORKS

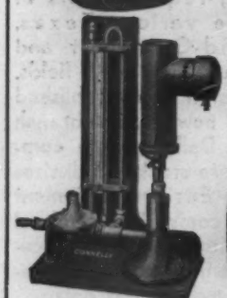
366 S. Fair Oaks Ave., Pasadena, Calif.
2400 Adeline St., Oakland, Calif.
Birmingham, Ala., and Jacksonville, Fla.

CONNELLY



DISTRICT REGULATOR

Advanced design for line pressures up to 100 lbs., in inches. Improved adjustable linkage between diaphragm and valve stem gives increased flexibility.



CALOROPTIC

Direct reading BTU indicators specially adapted for butane and propane plants.

Send for Bulletins

BACK PRESSURE VALVE—SENSITIVE

CONNELLY

IRON SPONGE & GOVERNOR CO.
CHICAGO, ILL. ELIZABETH, N.J.

Pacific Coast Representative:
Harry V. Payne, 3834 Third Ave.
Los Angeles, Calif.

The all-gas laboratory kitchen of McCall's Magazine.

McCall's Magazine Equips Modern Kitchen in New York Laboratory

A COMPLETELY gas-equipped kitchen is one of three kitchens and two test rooms just opened by *McCall's Magazine* on the thirty-ninth floor of the building at 444 Madison Ave., New York City. The new quarters, occupying the entire floor, have new equipment throughout, providing complete facilities for experimental work.

The gas-equipped kitchen follows the approved L-shaped design. A second kitchen, electrically equipped, is laid out in U-shape. In these two kitchens is carried on experimental work in foods and cookery methods. Adjoining them is a smaller, home-sized kitchen, where such work is carried on as the preparation of food to be photographed for use in *McCall's Magazine* or in service booklets.

In the two test rooms, household appliances and equipment are used just as they would be used in homes, except that variables are eliminated through carefully and scientifically controlled conditions. Cleaning and laundering, as well as cooking projects, are carried out to determine most efficient methods for the housewife.

Indiana Home-Heating Group Holds Conference

More than 160 Indiana gas home-heating salesmen and gas company officials attended the mid-summer statewide sales conference of the Indiana Gas Association home-heating division in Indianapolis.

"How To Make Sales Presentations Stay Presented," a motion picture sound film, highlighted the day's meeting. A dramatized presentation of "Telephone Technique and Its Effect on Sales" illustrated a more effective use of the telephone for gas home-heating salesmen. Surface Combustion Corp.'s new sound-slide film, "Life As You Would Have It," rounded out the "triple bill." The program also included talks and discussion of home-heating problems by manufacturers' representatives and gas company officials.

Arrangements for the sales conference were made by Fred G. Rastenburg, Homer Hull and Ed Demlow, all of Citizens Gas and Coke Utility; Don Alfred of the Public Service Co. of Indiana; and by Bozell and Jacobs, Inc., the association's advertising agency.

Other utilities represented at the meeting were Gary Heat, Light and Water Co., Southern Indiana Gas and Electric Co., Central Indiana Gas Co., and Northern Indiana Public Service Co.

■ ■

Biard and Wyche Promoted By United Gas Company

A. J. Biard, who has been chief clerk for the Beaumont district of United Gas Public Service Co., has been promoted to a position in the auditing department of Houston Gas & Fuel Co., Houston, Texas, according to announcement to newspapers by W. F. Ivers, district manager. C. C. Wyche of the Houston office auditing staff succeeds Mr. Biard.

FULL CAPACITY FLOW

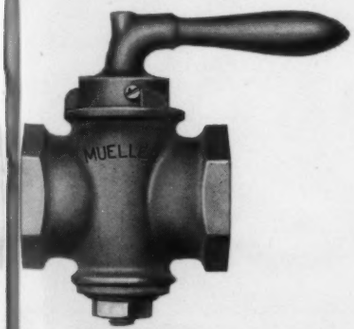
MUELLER GAS STOPS

EXTRA SEALING LAP

LOW AND INTERMEDIATE PRESSURE STOPS

H-11007 Extra Straight Way Flat Head Pattern

H-11026 Extra Straight Way Lock Wing Pattern



H-11080 Solid Brass Lever Handles with Check

SCIENTIFICALLY CONSTRUCTED TO MEET EVERY NEED

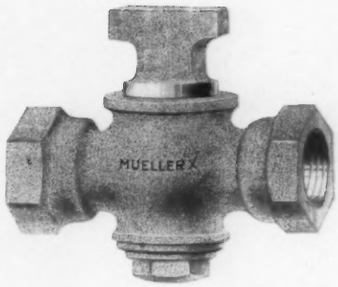
Mueller Brass Gas Stops are made in either the straight or round way patterns, and always with generous proportioning to give full capacity flow and extra sealing lap. They are furnished in flat, tee, square, socket head or solid brass lever handle types, with or without check. Besides a wide line of regular style stops, there are other styles with lock wings, Minneapolis tops and other special features to meet particular needs.

The Mueller company is one of the oldest manufacturers of ground key plug stops. They have continually developed and improved their manufacturing processes to the high degree of precision maintained today. Mueller Gas Stops are perfected in design because long experience has continually contributed to their improvement, they are machined to precision exactness by scientific processes, then they are carefully tested with air while submerged in liquid. Let Mueller's know your needs for Brass Gas Stops. They will supply you with full information for your particular requirements.

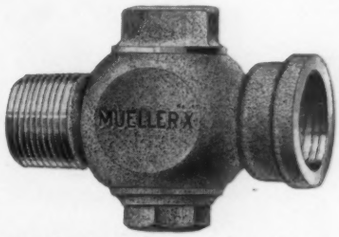
MUELLER CO.

DECATUR, ILLINOIS

EXTRA HEAVY HIGH PRESSURE STOPS



H-11066 Extra Heavy Tee Head Service Stop

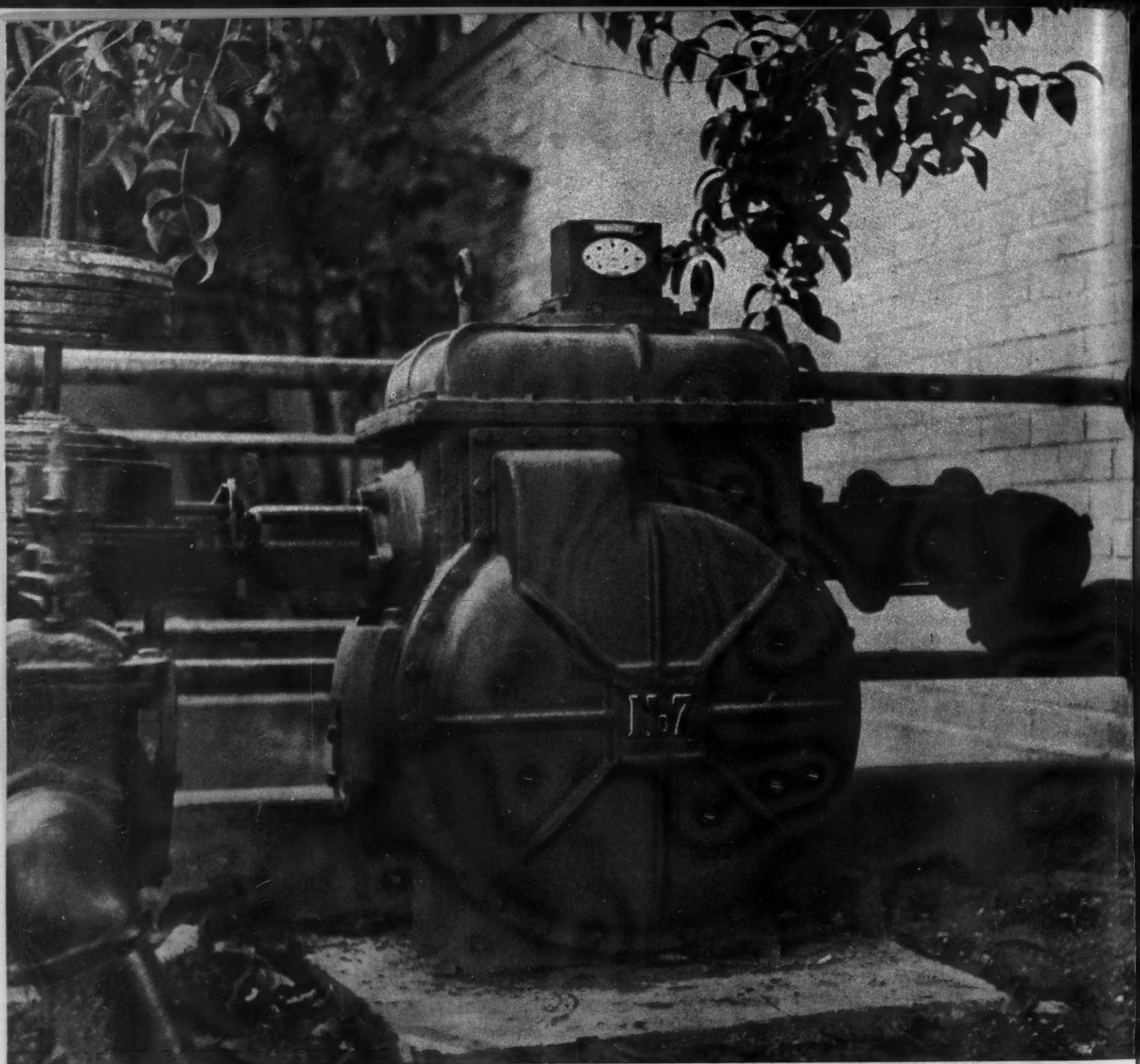


H-11070 Extra Heavy Gas Main Stop

H-11074 Special Weight Gas Service Stop

MUELLER

GAS DISTRIBUTION EQUIPMENT



SPRAGUE INDUSTRIAL METERS

HIGH & LOW PRESSURE

DEPENDABILITY—ACCURACY—LONGER LIFE

& LOWER OPERATING COSTS

WRITE FOR BULLETINS No. 16A and No. 19

THE SPRAGUE METER CO., BRIDGEPORT, CONN.